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ABSTRACT

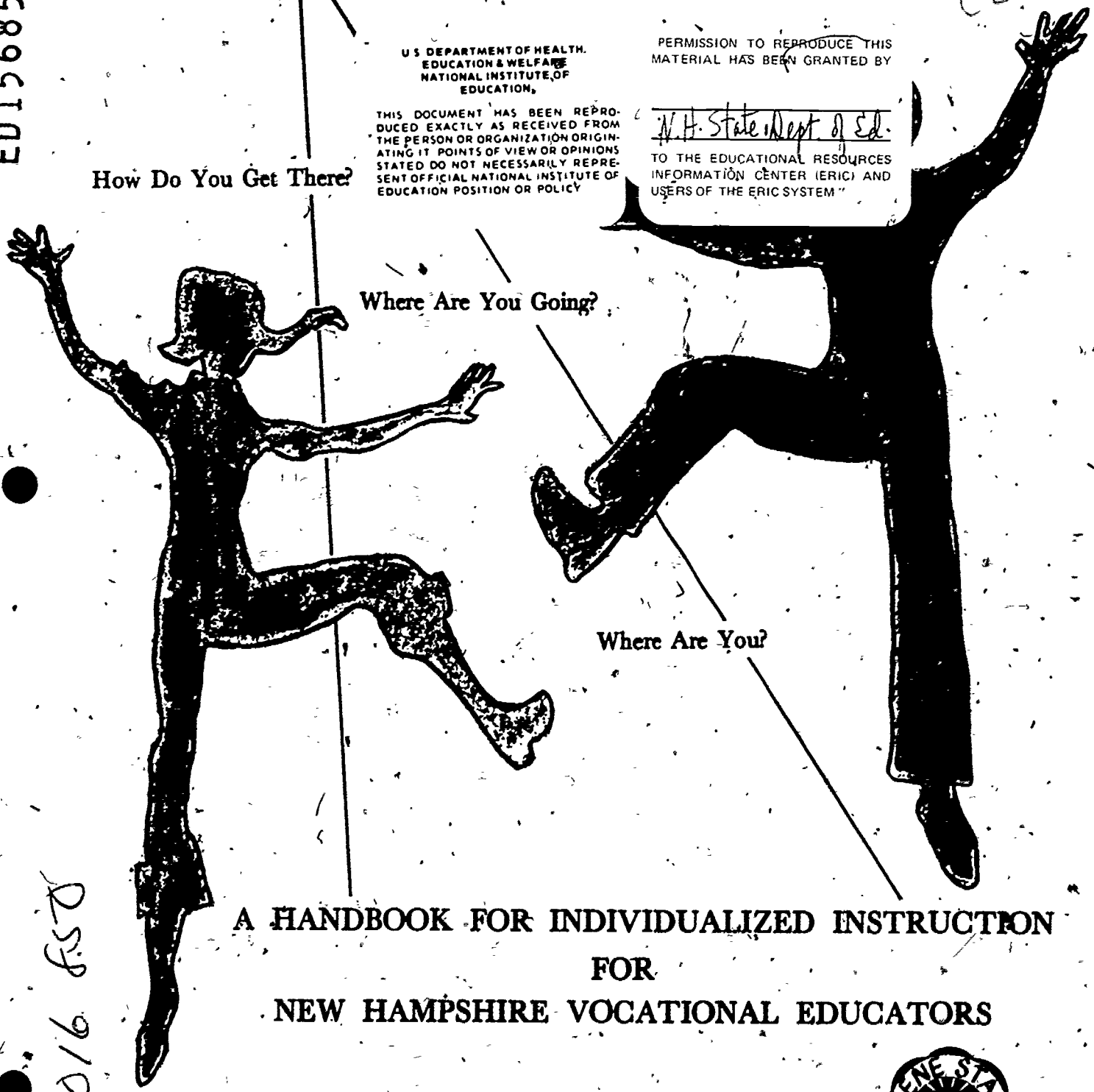
Provided is a guide to individualizing instruction in vocational education. Background information on the Alternatives Approach to Individualization in Vocational Education (AAIVE) Project and an introduction to the publication are presented in section I. Section II contains a glossary of terms used in this handbook and in the literature pertaining to individualized instruction. Section III provides a system to identify the current level of individualization in a classroom: a questionnaire to ascertain the main elements of an instructional program and a chart to demonstrate where the elements fit into the broad framework of individualized instruction. Section IV discusses possible issues encountered in developing a program: administrative support, facility usage, planning time, scheduling, resource selection, implementation process, teacher-dependent and special needs students. Section V presents steps to individualizing a program: developing the curriculum, needs assessment, job family clustering, analyzing tasks, creating instructional objectives, selecting learning experiences, developing evaluation techniques, recordkeeping and followup, and putting the components together. Section VI is a resource and bibliography section including lists of model programs, information and resource centers, handbooks, catalogues, books and other publications relating to individualized instruction. Information on where to obtain or locate the information is provided. Section VII lists AAIVE project participating programs and administrators and consultants in the New Hampshire State Department of Education, Vocational-Technical Division; the section also describes writing behavioral objectives, outlines characteristics of different forms of media, and explains how to use the Dictionary of Occupational Titles and Vocational Education and Occupations. (JH)

IDENTIFYING AND IMPROVING VOCATIONAL INSTRUCTION

How Will You Know You've Arrived?

How Do You Get There?

Where Are You Going?



Where Are You?

A HANDBOOK FOR INDIVIDUALIZED INSTRUCTION FOR NEW HAMPSHIRE VOCATIONAL EDUCATORS

Graphics and layout by Diane Stolar

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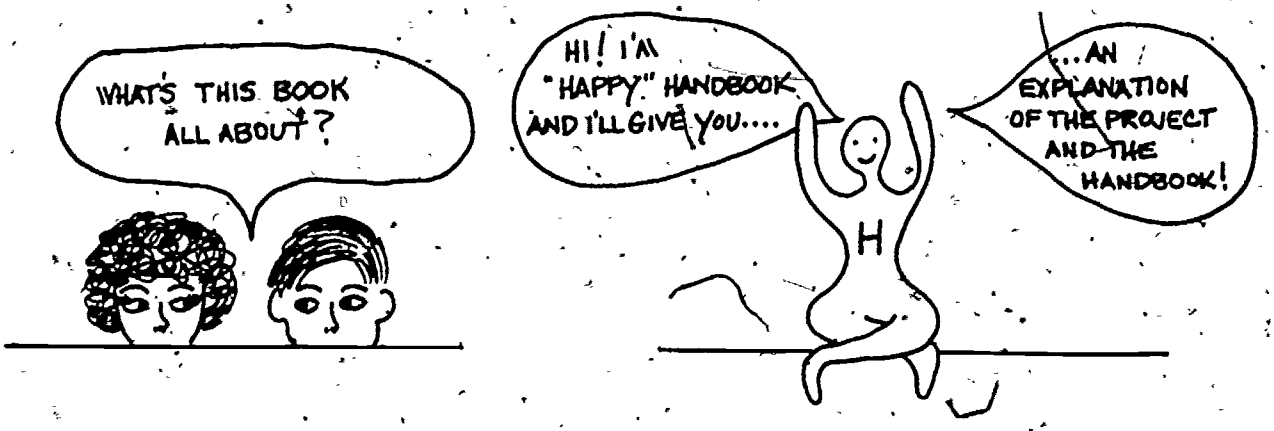


SECTION I

INTRODUCTION

BACKGROUND OF THE AAIVE PROJECT

INTRODUCTION TO THE HANDBOOK

BACKGROUND OF THE AAIVE PROJECT
AND
NEW HAMPSHIRE VOCATIONAL EDUCATION

In the past seven years, enrollments in New Hampshire vocational programs have increased significantly. Secondary enrollments have increased from 30,000 to 54,000 students, post-secondary from 1,600 to 3,000 students, and adult programs from 3,500 to 6,900 students.

The current projections of labor demands reflect increased job opportunities for those students acquiring job skills in programs below the baccalaureate level. This evidence, then, leads us to believe that enrollments in vocational education at all levels will continue to increase.

The value of quality vocational education for New Hampshire citizens was recognized in the 1960's through legislative and funding support of the post-secondary vocational-technical college system. The recognition is currently continuing, with similar support for secondary programs, through the 20 area center plan.

With the expansion of enrollments and numbers of programs, vocational educators have an opportunity to investigate alternative instructional methods that may improve the quality of instructional programs, as well as serve a greater number and variety of people.

During the past three years, the Vocational-Technical Division of the New Hampshire State Department of Education has granted as much as 50 percent of their research and exemplary monies to local school districts to aid in the development of model vocational training programs

with alternative methods of instructional delivery.

Innovative instructors, seeking to improve classroom and laboratory learning, have discovered or improved a variety of ways to tailor the instructional process to the individual student.

In December, 1975, a proposal to research the effects of six selected Alternative Approaches to Individualizing in Vocational Education (AAIVE) was developed by Dr. Richard Gustafson, Associate Dean, Keene State College, Dr. Lila Murphy, former Research Coordinating Unit (RCU) Director of the Vocational-Technical Division of the New Hampshire State Department of Education, and John R. Faust, former Curriculum Specialist with the New England Resource Center for Occupational Education (NERCOE).

The proposal was designed to study the six alternative approaches to determine the effectiveness of each program in terms of the learning efficiency, the number and variety of students being served, and the various reasons the program instructors selected their alternative approach.

The participating instructors were able to profit from their involvement in the project, which provided both material and consultative support to each project site. Through participation in the project, each of the six programs has become an observable model of an alternative approach to individualizing instruction.

The names of the participating instructors, their programs and schools appear in the Resource Section of this handbook. Full descriptions of the programs can be found in the Supplementary Materials Section.

INTRODUCTION TO THE HANDBOOK

Over the last decade, the research and discussion around the concept of individualized instruction has filled the journals and monopolized conferences. The term alone invites a wealth of reactions -- anything from avid enthusiasm to suspicious consideration to outspoken criticism. That depends, of course, on who's doing the reacting.

Let's think for a moment about this revolutionary approach to instruction. Revolutionary? What was a one-room schoolhouse, other than one of the earliest examples of individualized instruction? The difference is that in <u>that</u> instance, individualization was a <u>necessity</u>. Current thought advocates using this mode of instruction as a basis for <u>improving student learning</u>.

When we refer to individualized instruction in vocational education, we must focus our attention on two areas. The first is that this is a student-centered approach; one that is geared toward the self-mastery of job-entry level skills, or competencies. The second deals with the instructional process itself. This approach is organized in such a way that pace, strategy and objectives are tailored to the needs, abilities and experiences of the individual student and his or her learning style.

Before going any further, perhaps it would be best to clear up a few of the common misconceptions about individualized instruction. Implementing such a course of instruction does <u>not</u> mean:

- that you will spend 15 minutes standing over Michael and then move to where Susan is and spend the next 15 minutes with her and then move to.....

  Not only is it unreasonable to expect this kind of attention,

it's an impossibility - unless you have a total of four students in the class.

- that you are slowly but surely being put out to pasture, with your life's work being taken over by a computer or cassette-audio tape deck.

The idea is to take all of your knowledge, qualities, feelings and experiences (which no learning package will ever have) and utilize them in the most efficient manner. You are there to help students learn - not spoonfeed facts and formulas, demonstrate for the tenth time in an hour how to re-set points or make hospital corners. You've far better ways of using your time. And that is what we hope to show you in this handbook.

All fields of study come complete with their own vocabularies. Individualized instruction is no different. It has a shoptalk all its own within the broader field of educational theory and technique. The glossary included in the handbook is fairly extensive, covering a broad range of terms and concepts. Although some of these terms are mentioned only briefly in other sections of the handbook, they are included here because you might encounter them in other literature or discussions and will be familiar with the particular language of individualized instruction.

Following the glossary is an Identification System (composed of a questionnaire and chart) which will enable you to determine the extent of individualizing occurring in your present program.

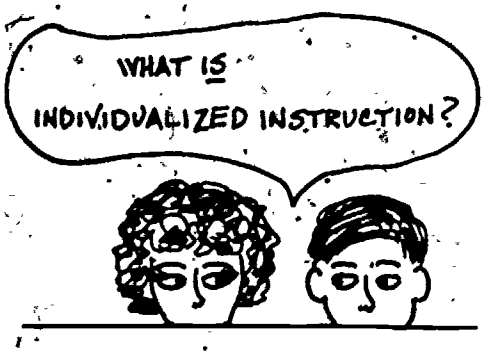
We've laid out a curriculum scheme (a blueprint, so to speak) which breaks down the basic components essential to an individualized program. There is no one way to pull these pieces together; in fact, budget and

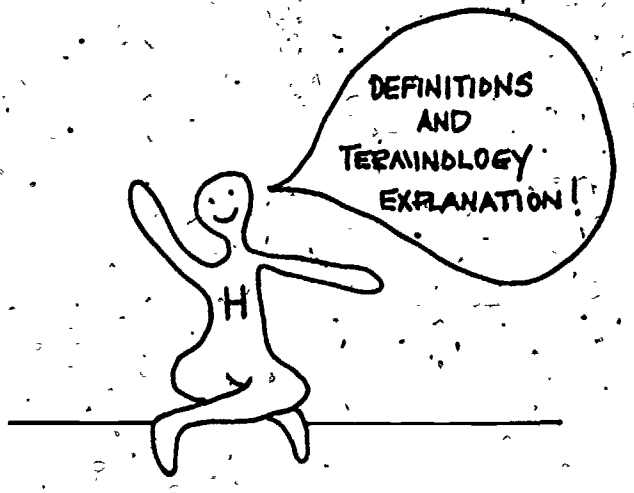
school policy limitations may not allow as extensive a program renovation as you might like. These considerations, as well as a variety of other potential questions are discussed in detail in the Issues Section of the handbook.

It is important to stress that what is presented here is not to be interpreted as some magical cure-all -- that by reciting strategy mumbo-jumbo, you will create a program prince where a program frog once stood. This is neither the motivation nor the intention in developing this handbook.

What <u>is</u> being suggested, however, is that the more you are able to integrate these methods and approaches into your program, the better equipped your students will be, and thus, the higher the success rate for both you and them.

The Resource Section includes not only a list of printed materials, but persons, programs and information centers that you can contact. Bear in mind that if you should have any problems using the materials in the handbook, we would advise you to meet with your department chairperson, vocational director or State Department of Education consultant. A complete list of State Department consultants is included in the Supplementary Materials Section.





SECTION II

GLOSSARY

INTRODUCTION TO THE GLOSSARY

The glossary is generally located near the end of any given publication. Why, then, does this one immediately follow the introduction? The authors feel that in order for you to use this handbook effectvely and efficiently, you would be best served by knowing what various terms mean before you come to them -- not after you've hunted around through back pages, losing your train of thought in the process. You may already be familiar with many of the terms in the handbook, in which case you are that much farther ahead. Before making that assumption, however, why don't you take a few minutes to go over the definitions? A little review never hurts.

As you proceed through the handbook, keep in mind that the glossary is a continuous source of information. Refer back to it any time you need clarification. Your success with implementing the material in the handbook is performance-based, not time-based. Sound familiar?

That is why this glossary is at the beginning of the book.

GUIDE TO TERMINOLOGY

[illegible]M AND INDIVIDUALIZED INSTRUCTION

Activity - an educational procedure designed to stimulate learning by firsthand experience; or observation, experiment, inquiry and discussion necessary to achieve an objective.

Aid, Teaching - an instructional device or equipment designed to facilitate learning.

Aide, Teacher - auxilliary personnel who assists in the classroom by providing management, tutoring and individual aid to students.

Clustering (or Job Family Clustering) - developing instructional content around a series of occupational titles having a common skill base.

[illegible]mpetency - demonstration of mastery of occupational requirements that includes skills, knowledge and attitudes necessary for job entry.

Competency-Based Education/Curriculum - a total system for planning, developing and implementing a curriculum designed to ensure that students acquire measurable skills, knowledge and attitudes essential for successful job performance.

Conditions - the part of the performance objective that identifies the given situations or circumstances under which the stated behavior is to occur.

Contract (Student Learning, Student-Instructor) - an agreement reached via discussion and negotiation between the student and instructor which outlines the pace, strategies and objectives the student will use, and provides individualizing of the course content (degree varies with each program).

Criteria - the part of the performance objective that specifies the standards selected as the basis for quantitative and qualitative comparison.

Criterion-Referenced Measure/Testing - an evaluation assessing the degree to which student performance meets the pre-determined performance objectives.

Curriculum Guide - a document outlining the intended field of study and instructional content; usually includes goals and objectives, learning experiences, activities, teaching aids, references and evaluation techniques from which the instructor may select.

Diagnosis - an assessment of the student's needs, abilities and deficiencies, insofar as development of an instructional program is concerned;

process of obtaining and analyzing data about students for the purpose of identifying individual learning requirements.

Disadvantaged Student - a student who is not functioning up to his or her potential, but who is not handicapped; causes may be either academic or economic in nature. (See Special Needs Student.)

Educational Goals - descriptions of the long-range aims of the educational program and/or system, or a broad general end toward which the program is directed.

Evaluation - the process of determining or judging the value of work or work product by use of a standard of appraisal.

Feedback - the process that provides the basis for evaluation of the student's learning capacity, appropriateness of instructional materials and methods; provides knowledge of results and clarification (component of the instructional package); the process by which output performance is compared with criterion performance, providing information about efficiency, advantages and disadvantages of the system.

Formal Presentation - an instructional mode characterized by the instructor lecturing to the class; directing and initiating all procedures (films, projects, tests) to the class as a whole. (See Large Group.)

Handicapped Student - a student, who because of physical, perceptual or emotional conditions, has an impaired ability to learn. (See Special Needs Student.)

Independent Study - a program in which the student, with the instructor's guidance, is permitted to work at his or her own pace, as well as contribute substantially to determining strategies and objectives.

Information Sheet - a form of instruction sheet containing a written explanation or description of terms, materials, relevant equipment, facts, processes, and so forth that are important or essential for the understanding of a specific job.

Individualized Instruction - an approach to teaching and education based upon the belief that there is no standard student, and that each learns best using pace, strategies and objectives that reflect his or her experiences, abilities, aptitudes and interests.

Instructional System - all components needed in the instructional process: needs assessment, occupational clustering, task analysis, competency-based objectives, teaching methods, criterion-referenced testing, evaluation, recordkeeping and follow-up; (A scheme for developing and achieving instructional objectives.)

Instructional Unit - instructional content (job/information sheets) containing a set of behavioral objectives, activities, pre-/post-checks,

resources and means of assessment; a group of related components or tasks in an occupation directed toward a common purpose.

Job Entry Level Skills - the skills, knowledge and attitudes that must be mastered or that demonstrate the minimum acceptable level of competency in order to meet employer's standards for specified work.

Job Family Clustering - See Clustering.

Large Group - one-way instruction used to provide factual information to an entire group. Presenter provides information to an audience. (See Formal Presentation.)

Learning Activities - See Activity.

Manager - the major role assumed by an instructor in an individualized instruction environment; tends to be more of an overseer who facilitates the learning process, as opposed to traditional role of leading, directing and determining what, how, when and where things will be done.

Mastery - the level of performance or achievement that consistently meets occupational standards or standards set by vocational teachers responsible for a specific vocational program.

Media, Instructional - print or non-print materials used to support, supplement or facilitate the accomplishment of instructional content.

Modular Instruction - self-contained packages including all components described in Instructional Units.

Negotiation - the process by which instructor and student arrive at an agreed-upon learning contract. (See Contract.)

Norm-Referenced Measure/Testing - instruments or measures that determine the quality of a student's performance in relation to the performance of other students on the same measurement device.

Objectives

1. Affective - statements concerned with changes in interests, attitudes, values, appreciation and personal social adjustment.

2. Behavioral - statements concerned with the behavior that instruction is to produce in terms of observable/measurable performance, along with the conditions under which the action is performed and (where appropriate) the criteria.

3. Cognitive - statements concerned specifically with thought processes (knowledge, understanding).

4. Instructional - statements that specify the content, process, skills and attitudes to be achieved by the instructional program.

5. Interim - statements of performance(s) required of the student in the process of achieving terminal objectives.

6. Performance - statements derived from the task analysis statement, given in precise, measurable terms, and that detail the particular behavior to be exhibited by a learner, as well as specifying the conditions and criteria associated with the behavior.

7. Psychomotor - statements that specify performance involving physical movement, acting on some part of the environment or material.

8. Sequenced - the process of arranging performance objectives in order to permit the learner to progress from one activity to another, building on previous experience to achieve the next objective (going from simple to complex).

9. Terminal - statements that specify what student performance is to be at the conclusion of instruction.

Occupational Field - a group of jobs that are related on the basis of required skills and knowledge.

Occupational Tests - a group of work activities that are associated for a common purpose or end, and that collectively, have meaning or use to a job.

Occupational Task Analysis - a determination of the necessary activities and skills involved for the successful performance of a task.

Open Entry/Open Exit - a program designed to allow students to enter or leave an instructional program at any time or level of knowledge.

Pace - the rate at which a student progresses through the learning activities and/or program. (See Time-Based.)

Peer-Tutoring - the practice of having students assist and teach each other in the learning process.

Performance-Based - when the scope and sequence of instruction is determined by student accomplishment of minimum competencies.

Performance Standards - the criteria specified in the performance objective in terms of observable, measurable behavior. (See Criteria.)

Post-Test (or Assessment) - an evaluation instrument that measures the behavior, abilities and skills of the student upon completion of instructional objectives or at the termination of an instructional unit.

Prescription - a personalized (individualized) plan or course of study designed for the student by the instructor, based on a diagnosis of the student's needs and abilities.

Pre-Test (or Assessment) - an evaluation instrument that measures the entry behaviors, abilities and skills of a student in terms of prior experience.

Recordkeeping - the maintenance of a student's progress and evaluation of the work, accomplished by the instructor and/or student at regular intervals.

Resources - includes both instructional media and facilities - e.g., slide-audio tapes, reference books, models, equipment, modules, simulators, learning packages, learning centers, carrels, mock-ups, games.

Self-expression - refers to student input in the instructional process.

Self-instructional - a characteristic of an activity or resource that allows the student to work alone at his or her own pace, including means for self-evaluation, feedback, readings, activities and pre- and post-checks.

Small Group - a type of instruction allowing for student reaction to, and interaction with, the instructional content.

Special Needs Student - a student who, by virtue of being either handicapped or disadvantaged, requires special services, programs or assistance in order to succeed in an educational program. (See Disadvantaged Student and Handicapped Student.)

Strategy - a detailed scheme of instruction, including methods and materials.

Task - a logically related set of actions required for the completion of a job.

Team-Teaching - the practice of having two or more instructors function as presentors, managers or tutors in the class or lab.

Time-Based - when the scope and sequence of instruction is determined solely by time.

Traditional Grading - See Norm-Referenced Measure/Testing.

Traditional Classroom/Education - an approach to teaching/education that treats all students as equal, not taking into account any individual differences with regard to pace, strategy and objectives. Utilizes norm-referenced testing, and teaching is directed at the group as a whole. All activities are determined, initiated and carried out by the instructor.

Undifferentiated - when pace, strategies and objectives are provided for the class as a whole, with no distinctions made to accommodate individual differences. See Traditional Classroom/Education.

Unit of Instruction - See Instructional Unit.

SECTION III

IDENTIFICATION SYSTEM

PROGRAM ASSESSMENT INSTRUMENT

IDENTIFICATION SYSTEM: LEVELS OF INDIVIDUALIZED INSTRUCTION

INTRODUCTION TO THE IDENTIFICATION SYSTEM

This section of the handbook provides you with a system to identify the current level of individualization in your classroom. The system is composed of a questionnaire and a chart representing levels of individualized instruction. It would be to your advantage, because of the inter-relationship of the two parts, to complete the questionnaire before turning to the chart.

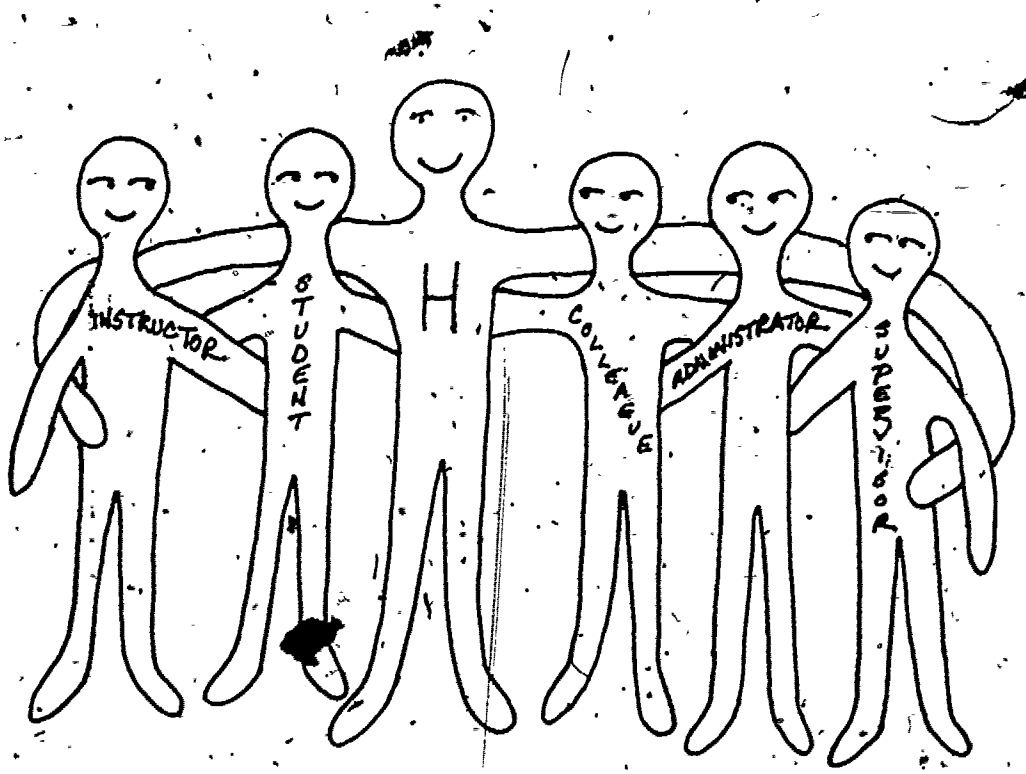
The questionnaire (or Program Assessment instrument) will allow you to ascertain the main elements of your current instructional program. The chart (or Identification System) will enable you to see where those elements fall in the broad framework of individualized instruction. This system is offered on the premise that an educator cannot successfully determine how and where to improve a program without a clear understanding of where he or she is starting from.

In addition to helping the individual instructor, the authors believe that this system can be used in several ways and by a variety of educational personnel. Some possible teaching relationships follow.

Instructor-Instructor (Colleague-Colleague)	Have a fellow instructor who is familiar with your program complete the questionnaire based on his/her perceptions of your class. You do the same for that instructor. Compare your results. It may help to provide some direction for future efforts for both of you.
Student-Instructor	With some explanation of terminology, ask your student(s) to complete the

Student-Instructor (cont'd.)	questionnaire. Again, compare the results. A student perspective could prove quite valuable.
Supervisor-Instructor	Ask a supportive (that is, someone you are comfortable working with) supervisor to complete the questionnaire. This could be your department chairperson. Once the variations are identified and the differences analyzed, program improvement can result.
Administration (Vocational Director)	This system can be used by administrative personnel for all instructors in a vocational center to determine any lack of staff competency in a given classroom component. The administrative personnel may then use the information as one of the guides to establish future staff development plans.

Remember, if you should find yourself confused by any of the terminology in this section, please refer back to the Glossary.



PROGRAM ASSESSMENT INSTRUMENT AND IDENTIFICATION SYSTEM

The first part of the system, described in the preceding introduction, is the Program Assessment instrument (or questionnaire). There are five sections and a total of 26 multiple choice statements. The sections correspond to classroom components: Student, Teacher, Instructional Content, Environment and Media. It is important that you select the most appropriate statement based upon your program as it now stands.

Some of you may be involved in programs that necessitate choosing more than one statement. If this is the case, circle the applicable statements. Remember, however, that this should be done only if you use radically different approaches within the same program.

As you are filling out the questionnaire, you will see that immediately following each statement are one or more numbers in parenthesis. These numbers correspond to the other part of this section, the Identification System (or chart). A few words of explanation about the chart are in order because, at first glance, it appears to be a rather complicated affair. It is, however, along with the questionnaire, probably the most important part of this handbook, and the product of extensive review of literature and research.

Along the left-hand margin, you will see the same five headings contained in the questionnaire: Student, Teacher, Instructional Content, Environment and Media. There seems to be general agreement that these constitute the basic components in any classroom, and the chart has been structured to include the main elements of each of these components.

The headings across the top of the chart represent examples of various

instructional programs. Thus, by arranging the chart in this fashion, it is possible to read across - seeing how one element changes in relation to different programs, or to read down - thereby assessing an instructional system in its entirety. Here you have it: a complete cross-referenced reference.

When you have completed the questionnaire, it would be helpful to have a felt-tip marker, crayon or colored pen. For each statement you chose, refer to the numbers in parenthesis. These numbers are to serve as an aid in locating the correct chart column for your responses. Underline the appropriate chart statement(s) as indicated in the example below.

STUDENT COMPONENT

1.0 The student:

a. progresses through learning activities that have been determined by the teacher (1,2)
b. progresses through activities varied by teacher in terms of pace and strategy (3)
c. engages in teacher-determined activities, based on the results of a pre-test (4)
d. participates in the activity selection process (5,6)

Underline statement 1.0 under Instructional Programs #1 and #2 on the chart. Proceed in this manner until you have plotted all your questionnaire choices onto the chart. It is important to realize that no one statement will help to determine your level of individualization; but answering all 26 will.

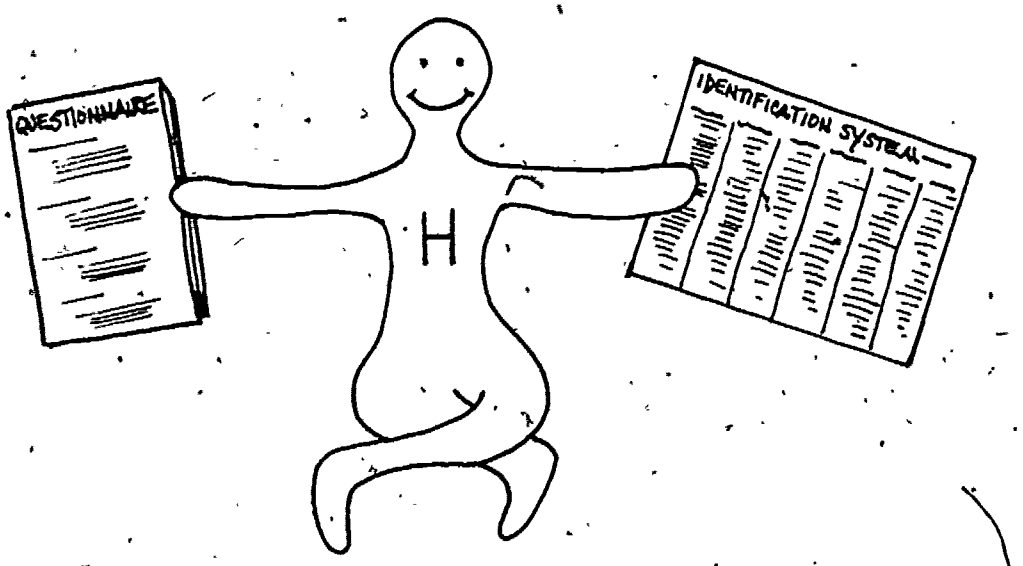
What will probably happen is that your responses will be spread out over two or more columns; but it should give you a fairly reliable assessment of your program as it now stands.

This instrument is intended for use as a tool. There are no hidden

turns, no right or wrong choices. It is, hopefully, a way to identify the critical elements of your program and, based upon the pattern that emerges on the chart, indicate your current position on the individualized spectrum.

When you have finished, it might be interesting to examine what the other listed program alternatives involve, if only to see how they might differ from your own. Check for possible advantages or disadvantages. The programs described here are only examples. They are offered as jumping-off points, to get your thoughts and imagination flowing.

The remainder of the handbook deals with information you will need to know, should your thoughts lead you to consider changes in your existing program. In any event, we urge you to read on. Some of the issues and systems of classroom or laboratory instruction are discussed and may be valuable to you, even if you are entirely satisfied with your current program.



PROGRAM ASSESSMENT INSTRUMENT

FOR

IDENTIFICATION SYSTEM: LEVELS OF INDIVIDUALIZED INSTRUCTION

STUDENT COMPONENT

1.0 The student:

a. progresses through learning activities that have been determined by the teacher (1,2)
b. progresses through activities varied by teacher in terms of pace and strategy (3)
c. engages in teacher-determined activities, based on the results of a pre-test (4)
d. participates in the activity selection process (5,6)

1.1 Quantity/Quality standards are:

a. provided by the teacher and the same for all students (1)
b. provided by the teacher with some variation for individual differences (2,3,4)
c. provided by the teacher, but shaped by student input (5,6)

1.2 Overall student self-expression can best be described as being:

a. limited to student response to teacher inquiry (1,2)
b. encouraged in the form of group and teacher-student discussions (3,4)
c. essential for purposes of accommodating student learning styles (5,6)

1.3 Regarding curriculum content, previous experience/knowledge is:

a. not a determining factor (1,2)
b. measured and the program adjusted accordingly (with regard to pace, strategy and objectives - or a combination thereof) (3,4,5)
c. the basis for estimating student entry at a particular level (6)

1.4 Special abilities/deficiencies are:

a. recognized, but for whatever reasons, given little consideration (1)
b. recognized, and minimally incorporated into the program (2)
c. recognized and incorporated in planning strategies; may be determined by a pre-test (3,4)
d. diagnosed and may be negotiated in terms of strategies and objectives (5,6)

1.5 Regarding small group, individual and peer-tutoring approaches, students have:

a. little, if any, small group work; no individual work or peer-tutoring (1)
b. limited work with small groups or individuals (2)
c. some small group work; individual work if time allows; limited peer-tutoring (3)
d. some small group; mostly individual work; peer-tutoring (4)
e. substantial amount of both teamwork and individual attention (5,6)

TEACHER COMPONENT

2.0 The teacher:

a. spends majority of time in formal presentation to class (1)
b. spends much of time in formal presentation, but encourages questions (2)
c. engages in some formal presentation, but encourages discussion (3)
d. engages in minimal formal presentation, spending majority of time initiating discussions (4)
e. engages in little or no formal presentation (5,6)

2.1 The curriculum/lesson plans are:

a. based on instructor's outline; derived from textbook and the same for all students (1)
b. based on instructor's outline, but varied as to pace, strategy and objectives - or a combination thereof (2,3,4)
c. based on an educator-produced curriculum guide, with strategy and objectives discussed with student (5)
d. contracted/selected by student with objectives approved by instructor (6)

2.2 Regarding work with individuals and small groups, the teacher:

a. engages in limited work with individuals and small groups (1,2)
b. emphasizes small groups, works with individuals if time permits (3)
c. spends majority of time with individuals and small groups (4,5)
d. spends majority of time tutoring individuals (6)

2.3 The teacher's role is:

a. sole purveyor of knowledge (1,2)
b. largely that of manager of learning activities (3,4,5)
c. diagnostician, tutor and manager of learning (6)

INSTRUCTIONAL CONTENT COMPONENT

3.0 Instructional objectives are:

a. related solely to teacher activities and the same for all students (1)
b. related to teacher activities, but somewhat flexible as to differences in student learning style (2,3)
c. related to student skills as determined by a pre-test (4)
d. pre-determined, but negotiated on an individual basis (5)
e. negotiated and discussed (6)

3.1 Instructional content is:

a. uniformly selected and presented to all students by instructor only (1)
b. uniformly selected and presented to all students with some tutorial help (2)
c. uniformly selected and presented to all students, but flexible as to activities (3)
d. individually prescribed for each student by instructor (4)
e. jointly established by teacher and student (5,6)

3.2 Special needs students:

a. have difficulty fitting into the program design (1)
b. have minimal variation in program (in regard to pace only) (2)
c. are accommodated by variations in pace and strategy (3)
d. are accommodated by an individualized prescription (4)
e. are accommodated through joint establishment/discussion of strategy (5)
f. are accommodated through joint establishment/discussion of strategy and objectives (6)

3.3 Student performance is tested by:

a. comparison with other students' performances (norm-referenced)(1,2)
b. comparison with minimum competency standards (criterion-referenced)(3,4,5

3.4 The instructor's method of grading is:

a. traditional (letter or numerical grade) (1)
b. traditional, with some consideration given to special needs students (2)
c. pass/fail - usually converted to norm grading (to accommodate school policy) (3,4)
d. pass/fail - may or may not be converted (to accommodate school policy)(5,6)

3.5 Course content:

a. is not revised on a regular basis (1)
b. is modified to meet group competency needs (2)
c. provides limited alternatives for student differences (3)
d. is prescribed for individual student by teacher (4)
e. is prescribed for individual student by teacher with student input (5)
f. is selected by student with teacher approval and guidance (6)

3.6 Instructor diagnostic and prescriptive measures are:

a. not currently parts of your program (1)
b. minimally used to determine pace (2)
c. used to determine pace and strategy (3)
d. provided for each student with regard to pace, strategy and objectives (4,5)
e. provided for and discussed with each student (6)

3.7 Evaluation techniques are:

a. limited in method and teacher-accomplished (1,2)
b. varied in method and teacher-accomplished (3)
c. varied in method, teacher-accomplished, but student self-evaluation is encouraged (4,5)
d. varied and jointly agreed to between teacher and student (6)

3.8 Recordkeeping is:

a. rank book type, teacher-accomplished (1)
b. adjusted to accommodate learning styles, teacher-accomplished (2)
c. adjusted to accommodate learning styles, teacher-accomplished, but student access assured (3,4)
d. student-maintained, teacher-validated (5,6)

3.9 Performance feedback is accomplished:

a. by group review only (example: tests) (1)
b. individually, only when student is having problems (2,3)
c. individually, on a regular basis (TIME-BASED) (4,5)
d. individually, on a regular basis (PERFORMANCE-BASED) (6)

ENVIRONMENTAL COMPONENT

4.0 The course schedule is:

a. pre-determined and regulated (1)
b. pre-determined and regulated with minimal variation for pace differences (2)
c. flexible (3)

(continued on following page)

d. varied according to individual prescription (4)
e. dictated by instructional units (5)
f. determined by outcome of negotiated activities (6)

4.1 Students:

a. all do the same thing at the same time (1)
b. may or may not do the same thing at the same time (2,3)
c. work mostly in small groups or on an individual basis, determined by teacher or curriculum guide (4,5)
d. work mostly on an individual basis, determined by objectives (6)

4.2 Regarding resources:

a. usage is teacher-determined and limited in variety (1,2)
b. alternative resources are available; but usage is teacher-determined (2)
c. extensive alternative resources are available to student with teacher approval (4,5)
d. extensive alternative resources are available to student as set forth in teacher-student contract (6)

MEDIA COMPONENT

5.0 Textbook usage can best be described as:

a. single text predominates (1)
b. textbook with supplementary print materials (2,3)
c. programmed texts (4)
d. alternative printed materials (5,6)

5.1 Non-print media is:

a. limited in use (1,2,3)
b. used to supplement programmed texts (4)
c. used extensively and related to objectives (5,6)

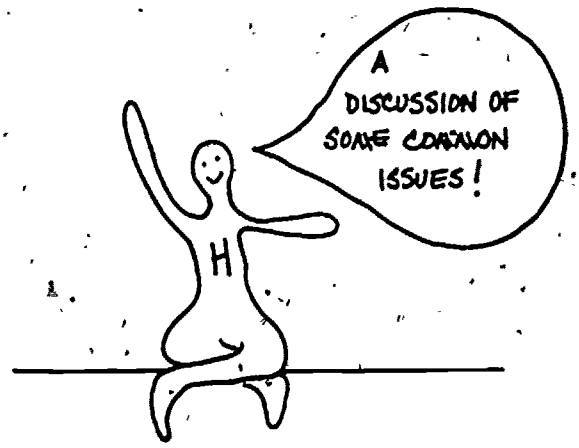
5.2 Use of media materials is:

a. teacher-controlled (1,2,3,4)
b. teacher-identified but student-controlled (5,6)

IDENTIFICATION SYSTEM: LEVELS OF INDIVIDUALIZED INSTRUCTION

	INSTRUCTIONAL PROGRAM #1 *Pace, Strategy, Objectives — Same for all students/determined by instructor*	INSTRUCTIONAL PROGRAM #2 *Pace, Strategy — Varied by instructor; Objectives — Same for all students/determined by instructor*	INSTRUCTIONAL PROGRAM #3 *Pace, Strategy — Varied by instructor; Objectives — Same for all students/determined by instructor*	INSTRUCTIONAL PROGRAM #4 *Pace, Strategy, Objectives — Student-determined (in given framework) Varied and determined by instructor*
STUDENT COMPONENT	1.0 Looks to teacher for all learning activities. 1.1 Looks to teacher for quantity/quality standards 1.2 Self-expression limited 1.3 Previous experience/knowledge not a determining factor 1.4 Little recognition of special abilities/deficiencies 1.5 Little, if any, small group work; no individual work or peer tutoring	1.0 Progresses through required learning activities 1.1 Looks to teacher for quantity/quality standards; pace somewhat flexible 1.2 Self-expression limited 1.3 Previous experience/knowledge not a determining factor 1.4 Special abilities/deficiencies recognized; minimally incorporated into program 1.5 Limited work with small groups/individuals	1.0 Progresses through varied required learning activitids 1.1 Looks to teacher for quantity/quality standards; pace/strategies more flexible 1.2 Self-expression encouraged 1.3 Previous experience/knowledge utilized in determining learning strategies 1.4 Special abilities/deficiencies incorporated into strategies 1.5 Some small group work, limited peer tutoring, individual work if time allows	1.0 Varied learning activities determined by pre-test indicating needed skills 1.1 Looks to teacher for quality/quantity standards; self-paced in teacher-established framework 1.2 Self-expression encouraged 1.3 Previous experience/knowledge essential for determining strategies/objectives 1.4 Special abilities/deficiencies determined by pre-test. 1.5 Peer tutoring, self-correction and limited self-prescription encouraged; small group used, but mostly individual
TEACHER COMPONENT	2.0 Majority of time spent lecturing to entire group 2.1 Use of teacher outline/lesson plans, prepared from textbook 2.2 Limited work with individuals/small groups 2.3 Functions as sole purveyor of knowledge	2.0 Mostly large group lectures, questions encouraged 2.1 Use of teacher outline/lesson plans; some individualization as to pace 2.2 Limited work with individuals/small groups 2.3 Functions as sole purveyor of knowledge	2.0 Some large group lecture, questions/discussion 2.1 Use of teacher outline; variation in pace/strategy 2.2 Emphasis on small groups; works with individuals if time permits 2.3 Functions largely as manager of learning	2.0 Minimal lecture, teacher-initiated discussion 2.1 Use of teacher outline; variation in strategy/objectives 2.2 Time spent tutoring individual students/small groups 2.3 Functions largely as manager of learning
INSTRUCTIONAL CONTENT COMPONENT	3.0 Instructional objectives related to teacher activities 3.1 Uniformly selected/presented to all students 3.2 No method(s) to handle special needs students 3.3 Performance compared to other students (norm-referenced) 3.4 Traditional grading 3.5 Little, if any, revision of course content 3.6 No presence of instructor diagnosis/prescription for individualizing. 3.7 Evaluation techniques limited in method, teacher-accomplished 3.8 Recordkeeping is rank book type; teacher-accomplished 3.9 Performance feedback by group review only	3.0 Instructional objectives related to teacher activities, but flexible 3.1 Uniformly selected/presented to all students; some tutorial help 3.2 Minimal variation for special needs students 3.3 Performance compared to other students (norm-referenced) 3.4 Traditional grading; some consideration for special needs students 3.5 Content adjusted to group competency needs 3.6 Minimal use of instructor diagnosis/prescription for individualizing pace 3.7 Evaluation techniques limited, teacher-accomplished 3.8 Recordkeeping adjusted for learning styles; teacher-accomplished 3.9 Performance feedback by group review; special problems handled individually	3.0 Instructional objectives related to student-teacher activities, but flexible 3.1 Uniformly selected/presented to students; flexible as to activities 3.2 Special needs students accommodated by variation in pace and strategy 3.3 Performance compared to minimum competency standards (criterion-referenced) 3.4 Pass/Fail usually converted to norm grading (to accommodate school policy) 3.5 Limited content variation 3.6 Increased instructor diagnosis/prescription to individualize strategies 3.7 Evaluation techniques varied; teacher-accomplished 3.8 Recordkeeping adjusted to accommodate learning styles; teacher-accomplished, student access assured 3.9 Performance feedback by group review; special problems handled individually	3.0 Instructional objectives related to student skills, determined by pre-testing 3.1 Prescribed for each student by instructor 3.2 Special needs students automatically accommodated by individualized prescription. 3.3 Performance compared to minimum competency standards (criterion-referenced) 3.4 Pass/Fail usually converted to norm grading (to accommodate school policy) 3.5 Content matched to student needs by teacher 3.6 Instructor diagnoses/writes prescription to meet student's needs 3.7 Evaluation techniques varied; teacher-accomplished, student evaluation encouraged 3.8 Recordkeeping adjusted to accommodate learning styles; teacher-accomplished, student access assured 3.9 Performance feedback on scheduled basis for individuals; emphasis on time base
ENVIRONMENTAL COMPONENT	4.0 Course schedule pre-determined and regulated 4.1 All students do same thing at same time 4.2 Resources teacher-determined	4.0 Course schedule pre-determined/regulated; minimum variation for pace differences 4.1 All students may/may not do same thing at same time 4.2 Limited alternative resources, teacher-determined	4.0 Course schedule flexible, based on variations in strategy/pace 4.1 Increase of small group/individual activities 4.2 Alternative resources teacher-determined	4.0 Course schedule varied according to individual prescription 4.1 Most activities small group/individual 4.2 Extensive alternative resources determined by teacher
MEDIA COMPONENT	5.0 Single textbook predominates 5.1 Non-print media limited 5.2 Media teacher-controlled	5.0 Textbook/supplementary print materials 5.1 Non-print media limited 5.2 Media teacher-controlled	5.0 Textbook/supplementary print materials 5.1 Non-print media limited 5.2 Media teacher-controlled	5.0 Programmed texts 5.1 Non-print media used to supplement programmed texts 5.2 Media teacher-controlled

INSTRUCTIONAL PROGRAM #5		INSTRUCTIONAL PROGRAM #6	
Pace – Determined by student *Strategy – Negotiated/discussed* *Objectives – Determined by educator-produced curriculum guide; but process discussed*		*Pace – Determined by student* *Strategy – Provided by activity description of goals and teacher guidance* *Objectives – Negotiated/discussed*	
1.0	Varied learning activities, student/instructor negotiated	1.0	Varied learning activities negotiated, tasks agreed upon
1.1	Quality standards written into curriculum, expressed in terms of competencies, quantity standards negotiated; self-pacing	1.1	Student aware of performance standards (quality), participates in choosing learning materials/goals; self-pacing
1.2	Self-expression encouraged/required	1.2	Self-expression necessary/integral to program
1.3	Previous experience measured, program adjusted accordingly	1.3	Student enters program at level commensurate with previous experience/knowledge (open entry)
1.4	Special abilities/deficiences diagnosed, incorporated into strategy by negotiation	1.4	Special abilities/deficiencies diagnosed/negotiated for strategies
1.5	Substantial amount of teamwork with other students; individual attention	1.5	Mostly team/individual work
2.0	Little formal presentation	2.0	No formal presentation
2.1	Use of curriculum guide; strategy/objectives discussed with students	2.1	Contracted or selected, teacher-approved objectives
2.2	Time spent tutoring individual students/small groups	2.2	Works mostly on an individual basis
2.3	Functions as manager of learning	2.3	Functions as diagnostician, tutor, manager of learning
3.0	Instructional objectives pre-determined, but negotiated on an individual basis	3.0	Instructional objectives negotiated and discussed
3.1	Jointly established by teacher/student	3.1	Content flexible in methods/activities through teacher-student contract
3.2	Special needs students accommodated through joint establishment/discussion of strategy	3.2	Special needs students accommodated through joint establishment/discussion of objectives and strategies
3.3	Performance compared to minimum competency standards (criterion-referenced)	3.3	Performance compared to minimum competency standards (criterion-referenced)
3.4	Pass/Fail many/may not be converted to to norm grading (to accommodate policies)	3.4	Pass/Fail may/may not be converted to norm grading (to accommodate school policy)
3.5	Content matched to individual need by teacher/student	3.5	Content selected by student, teacher approval/guidance
3.6	Diagnostic/prescriptive measures directly associated with curriculum guide objectives	3.6	Diagnostic/prescriptive approach included in negotiation contract
3.7	Evaluation techniques varied, teacher-accomplished, student evaluation encouraged	3.7	Evaluation techniques varied, jointly agreed to by student/teacher
3.8	Recordkeeping adjusted to accommodate learning styles; student-maintained, teacher validated	3.8	Recordkeeping adjusted to accommodate learning styles; student-maintained, teacher-validated
3.9	Individual performance feedback on scheduled basis; emphasis on time base	3.9	Individual performance feedback on scheduled basis; emphasis on performance base
4.0	Course schedule dictated by instructional units	4.0	Course schedule determined by outcome of negotiated activities
4.1	Mostly small group/individual activities, but determined by curriculum guide	4.1	All small group/individual activities
4.2	Extensive alternative resources available with teacher approval	4.2	Extensive alternative resources available as set forth in teacher-student contract
5.0	Alternative printed materials	5.0	Alternative printed materials
5.1	Non-print media extensive, related to objectives	5.1	Non-print media extensive, related to objectives
5.2	Media teacher-identified, student-controlled	5.2	Media teacher-identified, student controlled



SECTION IV

ISSUES YOU MAY ENCOUNTER

ADMINISTRATIVE SUPPORT

FACILITY USAGE (STUDENT SPACE)

PLANNING TIME

SCHEDULING

RESOURCE SELECTION

IMPLEMENTATION PROCESS

TEACHER-DEPENDENT STUDENTS

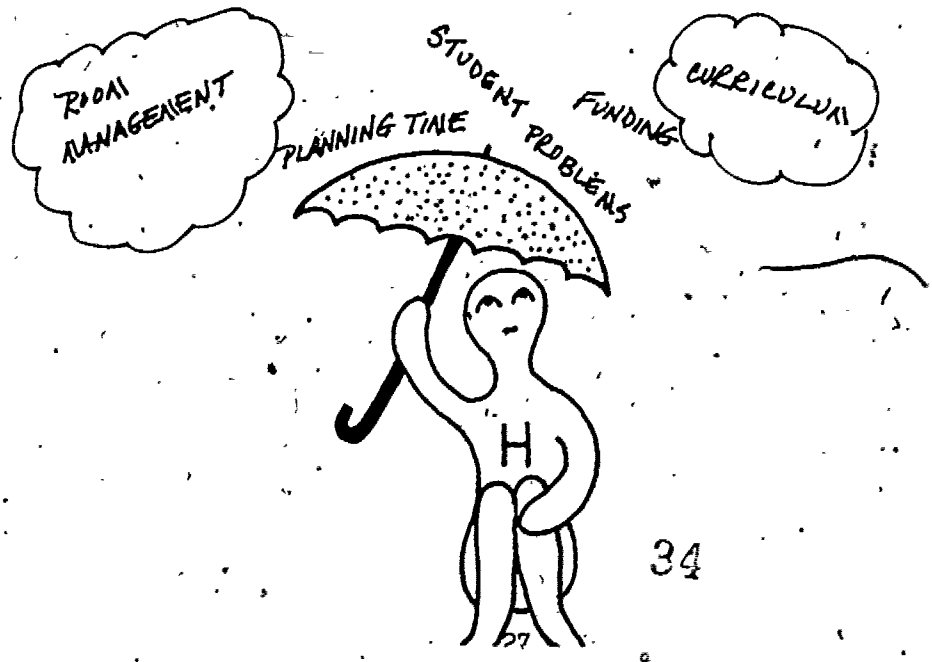
SPECIAL NEEDS STUDENTS

ISSUES IN DEVELOPING INDIVIDUALIZED INSTRUCTION

If you took the opportunity to complete the Identification System, you probably have made some decisions about the potential for further development of individualization in your program.

Instructors who have developed individualizing of classroom and/or laboratory instruction agree that many issues must be faced and solved. Some of these issues, such as the need for administrative support, limited funds, a well-organized curriculum and a variety of student problems, exist whether the program is individualized or not. Other issues, such as classroom management, instructor planning time or facility requirements, are unique -- mainly because the philosophy of individualizing instruction requires instructors to look at these problems in a new way.

The next two sections of the handbook are devoted to a discussion of these issues. Section IV is offered to you on the premise that success in individualizing is based upon the establishment of a well-defined curriculum. Section V is designed to aid you in solving many of the other issues that can determine the success or failure of your efforts.



ADMINISTRATIVE SUPPORT

Gaining administrative support for the instructional changes proposed by an instructor requires a total understanding of the administrative structure of the school system. Much caution should be taken not to by-pass any link in the "chain of command." A bruised ego or hurt pride can result in an unfavorable response to your request.

Once you have determined the proper avenue to take, your primary concern should be to make sure you are organized in your approach. You need not have the total program intact and ready to go, but you should have the process and direction set very clearly in your mind. Be prepared to answer questions such as these:

Will the change:

1. be able to fit into the existing school-wide schedule?
2. require additional personnel?
3. increase the budgetary needs?
4. increase the effectiveness of your program?
5. require additional space?

Your enthusiasm, commitment and credibility will most likely be the primary factors determining the outcome of your request. Don't be abrasive or hostile in your approach.

The next factor to concern yourself with is the financial support available to you, realizing that most school district budgets are prepared a year in advance. As the cost of an individualized program, especially during the implementation years, can be great, it is wise to have a phasing-in plan over a period of time.

You may experience a level of frustration if your proposal is not accepted in total. Don't say, "I've tried," and drop it at that point. You can begin gradually to implement your ideas. (See Implementation Process.) Once you can show success, financial support will come. To spend more time going over strategies for gaining financial support at this time would only confuse the real issue. Do you have the commitment?

FACILITY USAGE (STUDENT SPACE)

Once the decision has been made to individualize a program, the efficient use of space must be considered. In most cases, the resource area becomes the backbone of the program. Therefore, it is extremely important that materials are kept organized and that the general atmosphere of the area is conducive to learning.

If a resource area is to be used, where will it be located?

a. In the individual classroom?

b. In the school library?

c. In a separate resource room?

d. In a departmental resource room?

Anyone of the above mentioned locations will satisfy the need for an area to house the resource materials. Before selecting one of these areas, consider some of the following items:

A. Location of the resource center

1. Is it in a centrally located area?
2. Is it readily available to the students from your class?

B. Internal structure

1. Can materials easily be located in the area selected?

2. Do you need a quiet area?
3. Do you need an area where audio-visual materials can be used?

C. Supervision

1. Is a person available to assist students in locating materials?
2. Is a person available to monitor students while they are in the area?
3. Is a person available to organize and catalogue materials?

The right answers to these questions can be critical to the success of your individualizing efforts.

The physical layout of the classroom will be determined by the instructional activites; that is, whether you will be using work stations, small and/or large group instruction, resource areas, or whatever combinations will be appropriate for your program.

PLANNING TIME

Planning students' individual programs and the use of student time should begin with exercises designed to familiarize the instructor with each of the students. Such tools as questionnaires, checklists and personal interviews may be used. Students' past experiences, interests, needs and goals can then be determined; and individual program direction may be suggested on this basis.

To initially ease your students into their programs, while also doing the planning, the instructor might encourage students to set up their work plans. This allows the instructor time to work with each student in the negotiating of a plan of work. The student's program will then become the result of the student's choice and the instructor's guidance. This

method also allows the instructor some time to become acquainted with students, that is, their abilities and the relationship to the pace and strategies that will work best for the individual student.

Once the contract or plan of work has been established, the responsibility for learning and meeting deadlines then rests with each student. The need for a change in plans or contracts may become evident as the instructor increases in his or her perception of each student. Appropriate changes can be negotiated as needed.

SCHEDULING

It is important to introduce students to an individualized system of instruction with a rationale for it. Instructors often emphasize the importance of the subject matter covered in the course. In the same respect, the "whys" of individualizing should be clearly explained.

Realizing that individualized instruction does not preclude large group instruction, this method may be used to introduce students to the mechanics of the system. An instructor-directed session of the "hows" may be presented. In some instances, however, immersing students immediately and step-by-step may be more effective. Once a plan of work has been established, the student can program independently with the instructor assuming the roles of guide and resource person. Students learn to explore resources and rely upon them in place of the instructor for solutions to problem-solving activities.

To increase classroom organization, students might submit their activity plans, for either a day or several days, in advance to the instructor.

This allows the instructor time to review resources, prepare demonstrations, organize evaluations, and so forth. If daily recordkeeping is maintained by each learner, instructor planning time will be free to be used for these preparations.

Large and small grouping should be used in conjunction with individual, self-paced work in order to add variety to the daily schedule and promote student-to-student interaction on a wider scale.

To insure that instructor and student time is being used to its maximum effective value, a constant student monitoring process has to be instituted. This provision will remove the gray zone of low student motivation.

Each independent activity should have built-in checkpoints negotiated in the original work plan. The number and detail of checkpoints should be determined by the instructor's perceptions of each student's self-reliance and/or the difficulty of the activity.

RESOURCE SELECTION

In selecting appropriate resources for use by students, an instructor's exposure to all available resources and a thorough knowledge of all students is required. Resources should be available to serve the needs of varying ability levels of students as well as their best learning styles.

Each area of learning should offer students a variety of ways by which to learn: reading, listening, viewing and so forth. In order to maintain the use and effectiveness of all resources, it is important that the instructor develop a system for continuously integrating new resource

materials into the curriculum. It also may be necessary for an instructor to create resources to meet the needs of some students.

To promote positive learning experiences, it is the responsibility of the instructor to direct each student to resources at the appropriate level of learning. Students will then prefer to choose the method by which they most enjoy gaining information.

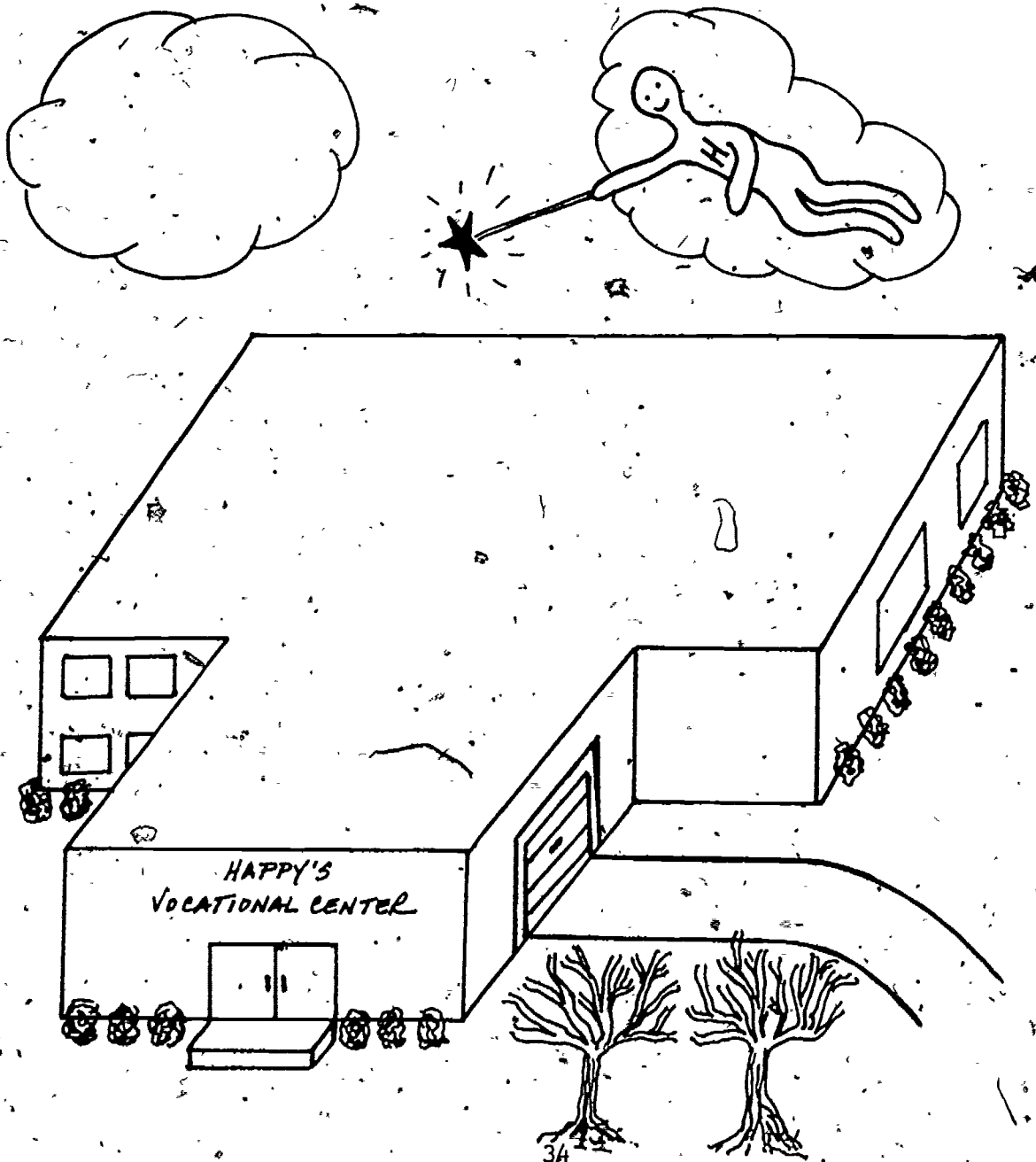
IMPLEMENTATION PROCESS

The implementation of an individualized program does not have to be an all-or-nothing situation. Often, it is necessary to move in the direction of individualization without totally disrupting the existing program.

In many cases, it is possible to use programmed texts and other types of packaged instructional programs as the first step toward the individualization of instruction. This method can be used for a very short instructional unit to get an idea of how the students will react to a non-teacher-directed experience. There is a very strong possibility that the initial reaction on the part of the students will be that they would rather go back to the old teacher-directed methods. Take some time at this point to explain in more detail the rationale for your change in direction, and how the students will benefit from the experience.

As you become more comfortable with this type of instruction, expand to include longer units of time. At this point, you should start noticing the sub-grouping patterns of the class; and the need for an individualized evaluation process will become quite evident. You will also notice that

some groups will be finishing up with the units, while other groups have not yet achieved the minimal set standards. This is the time to make another decision. Do you want to let the remainder of the groups catch up or do you want to let the students who finish first continue into new areas? If you choose to let the students go into new areas, then individualized instruction continues to grow toward a continuous progress individualized program.



BREAKING THE TEACHER-DEPENDENT STUDENT SYNDROME

Dependent students are those who rely heavily on instructors and others, not merely as sources of information, but also as guides for each step in the learning process. The student wants to do little, if any, decision-making. How can a student be held responsible for his or her actions if that student never makes the initial decision? You can't fail if you don't attempt something on your own. You can easily blame a failure on others if they have directed you.

A student will often rely on peers for direction by waiting to see what the peer will do before attempting a task by him or herself. The student does not trust his or her own judgment and needs to look to others who appear to be more able. This heavy reliance often makes instructors feel as if they or the self-reliant peers are doing all the work.

How do you break the dependent student syndrome to get students working and keep them working?

You don't label them as "lazy" or "cheaters." You also don't insist that they "can do the work, but just won't try." Your teaching techniques should emphasize choices and decision-making which can lead to success.

The student should participate in the selection of activities and work from a level determined by instructor-made tests and negotiations to meet mutually agreed-to student objectives. Activities or jobs can be arranged so that each student must follow his or her own set of directions. The instructor can review choices or decisions as they are made, but it is crucial to avoid correction or the implication that the way that has been

chosen by the student is "wrong." If what you want to foster is the independent decision-making process, the student must be allowed to explore and make mistakes in a non-critical atmosphere.

Fostering independent decision-making is what this section is all about. In it, we will explore some causes of the dependent student syndrome, some approaches to foster success and the important skills of negotiating and contracting. The section will end with an explanation of some of the types of rewards for motivation.

CAUSES

It is very tempting for an instructor to fall into a helping, parenting role with a student. The very nature of the teaching role can call for it. Students, themselves, are often begging to be "rescued." Often, they are helpless "victims." They "don't understand" or can't get started on a task.

Some of the understandable reasons for their attitude of helplessness are listed below:

1. They are handicapped and don't see themselves are being capable.
2. They have a poor self-image and are victims of a self-fulfilling prophecy. People don't expect them to produce or succeed, and consequently, they don't.
3. They have been coddled and spoiled by parents and others in their lives who, through either good intentions or guilt, have not let them become responsible.
4. They often have a long history of failure and hence fear new undertakings.
5. They feel unsure and stupid and need constant reassurance.
6. They are unfamiliar with equipment, vocabulary, class procedures and instructor expectations.

APPROACHES TO FOSTER SUCCESS

The basis for student dependency seems not only to be helplessness, but also lack of consciousness of the possibility of success, lack of responsible behavior and lack of a clear attainable model.

Initially, quality and independent work are not as important as simply starting and following through. You should prepare carefully organized directions that the student can see, read and even repeat orally to the instructor.

If a student does have trouble, she or he can return to a previous step and re-attempt it before asking for help. Asking for help is a good idea. It's just the over-reliance on it that you want to discourage. You will find that any evidence of success will lead to a desire to try again.

What can you do to encourage the continued success of your students? You can design very small, short term objectives for the student with specific benchmarks to earn a grade or reward, not get a "gift." Just as a skier must master the beginner's slope before going on to the intermediate or advanced ones, a student needs to master easy skills first. Rewards for success at each level should be tied into the negotiated performance-based activities.

As success comes, however, you can pull out the aids or props slowly. Your role is to help the student, not only by giving information, but by guiding the student toward independence and reasonable behavior.

How can you include success and good models without causing yourself a lot of extra work? How can you get better work and perhaps even more work from students who are not producing?

Have a dependent student work with another student on a rotating buddy

system where course credit may be earned for peer teaching. Another abler student can fulfill many of your functions and also act as a checker for a contract. The helper student can show how, but not do it for another student. Thus, both helper and "helpee" learn from the joint process.

NEGOTIATING AND CONTRACTING FOR RESPONSIBLE BEHAVIOR

Negotiating

In negotiating quantity, grades, tests, make-up work and expectations, you must have the student's input. Students need to be constantly encouraged to express their strengths and weaknesses and offer some alternatives. You can say,"How much of this job do you think you can finish this morning? I expect you to go right on by yourself."

You can offer choices of one thing or another. Best of all, you can refrain from evaluating a student's choices. Instead of saying "that's right" or "that's wrong", you might say, "Yes, that will do the job. What's another (not 'better') tool that might be easier or faster to use?"

Contracting

Contracting is one of the best possible means of validating the negotiating process. Contracting gives students control and responsibility. You can have a standard contract form which students may fill out with or without your help. Remember, these are not necessary for all students, but for those you want to motivate toward independence. Especially in the beginning, it is best to have contracts for very short term changes or projects with perhaps a checklist for checkpoints of success. These checkpoints may be, for example, finishing layout, cutting pieces, checking

measurements and so forth. The contract may also aid in organizing the student's thinking. It may be either written or oral.

Contracts may allow the opportunity to make a poor choice and then re-negotiate for a new choice. Making choices and decisions are very important competencies to foster.

Some rules for contracting are:

1. Make sure that a mutually agreed upon portion of the contract can be reached in a day or less, e.g., the layout of a job.

2. Be systematic and do not suspend the contract for special reasons or circumstances. If the contract says five pages, and you both agreed to it, offer means to complete the contract, such as getting outside help. If you want to modify, write a new contract.

3. Be very specific about accomplishments through the use of behavioral terms, if possible. For instance, "maintaining good eye contact" and "asking questions" are more effective than "paying better attention."

4. Ask for high quality work, to the limits of the individual. It is better to sacrifice quantity for quality. Do not settle for poor, hasty or sloppy work.

5. Contract for active behavior. Allow the student to check off consulting with other students, finishing different parts of a project, checking against well-done work, and so on. It is not productive to indicate that the student should "stop doing sloppy work."

6. Make sure the contract objectives and terms are clear and easily read by the student. If not, read them to the student.

7. What happens when objectives are not met in the negotiated time frame? Is this failure? Certainly not! Objectives include many variables and partial success can still be treated as success.

REWARDS

Why should a dependent student want to achieve some independence? Why change a comfortable, familiar pattern? Desirable rewards are powerful

motivators. Rewards can be offered for large and small achievements. A person who is afraid of the water should receive a reward for just getting in. Besides the obvious reward of grades, the following are some suggestions for motivation:

1. Social praise, compliments, smiles, approval
2. Material incentive: money, food, tools
3. Point system convertable to free time, pass to cafeteria
4. Time to work on own projects or workshop areas
5. Being able to do a desirable job or task
6. Peer approval (as in having a special job)
7. Good reports to parents

In thinking over what you have read here, just remember that what you are doing is creating a balance. On the one hand, you have the success and positive results as a reaction to your praise and attention. On the other hand, you want students to develop their own good feelings for a job well-done. Your job is to decrease the attention without upsetting the desired end product -- productivity.

WORKING WITH THE SPECIAL NEEDS STUDENT

As you work with special needs (handicapped and/or disadvantaged) students, you will find yourself automatically proceeding to a higher level of individualized instruction. Your role will immediately become that of a diagnostician, tutor and manager of learning. With experience, individual planning with individual attention can become easy.

With students who are aware of their own goals, quantity and expectations will naturally vary. The student's reading, writing, motor or memorizing ability will exist in very different degrees by the time you meet him or her in a vocational setting. Therefore, you have different expectations and goals for students according to their ability.

Modifications of goals and materials are contingent on an open student-teacher relationship. Negotiate and evaluate goals constantly to have the student work at the level you feel he or she is capable of. At the same time, negotiate for alternative levels and types of performance to prevent frustration and loss of motivation. Although negotiation is time-consuming, it helps to keep communication lines open and motivation high.

Many instructors who work with special needs students do not realize that their efforts and hard work now will result in substantial savings for everyone concerned in the long run. Social rehabilitation or a sense of personal failure on the part of a student is far more costly than the time or energy it will cost you to help avoid such outcomes. You can do it!

There are many academic and vocational instructors who modify their teaching styles when dealing with students who have weak reading or writing

skills, and never even realize it! Some modifications that have met with success are outlined on the next few pages.

In your classroom, you will have students reading at many different grade levels. To help match their differing abilities with your materials you might consider some of these suggestions:

1. Evaluate the readability (reading level) of all chapters of a text, manual, pamphlet or handout.
2. Have available materials at many reading levels - from elementary to college level.
3. Record lectures.
4. Have recordings of texts available. These may be obtained commercially or have students record them for extra credit.
5. Request easier-to-read materials from publishing companies.
6. Texts that are easier to read at any reading level usually have the following characteristics:
   a. pages that have enough blank space so as not to be confusing; this is especially true when there are pictures or diagrams involved.
   b. bold print or capital letters or different colored ink for important subject headings.
   c. vocabulary in bold print or defined on the same page it is used or at the end of the chapter.
   d. a glossary and index - the glossary should include a guide to pronunciation.

There are several different methods by which you can determine the readability of instructional material. Check with the special needs personnel of your school, your vocational director or your State Department of Education consultant. Readability is not at all difficult to determine and will save you and your students hours of frustration and difficulty.

Readability is only one concern. Let's look now at the questions of goal setting, giving directions, presenting material, note taking, vocabulary,

examinations, skill acquisition, behavior and evaluation and grading.

Goal Setting

- Allow each student to experience success based on his or her ability and, when necessary, modification of instruction.
- Tell students precisely what you expect them to memorize or know. Example: "You must memorize this procedure." "You don't have to memorize this; you will have the table to consult."
- Tell them precisely what you expect them to produce.
- See if they agree that they can meet your expectations.
- Tell the student each day or week that separate and discrete goals are expected.
- Set up contracts with students who are not producing.
- Establish short and long term goals for each student, based on the student's ability and continued progress.
- Decide whether it is memorization or understanding that is more important.
- Emphasize quality or quantity; not both.

Giving Directions

- Give only one or two directions at a time and check to make sure that they are understood.
- Ask students to put your directions into their own words.
- When there are written directions, try to make sure that each section of an exercise has its own directions; even if this means that you must duplicate them.
- Read directions to the class.

Presenting Material

- If you cannot read a mimeographed handout of your own, think about the student who has troubles without this added frustration.
- Break down complex ideas and tasks into smaller component tasks.

- When presenting material, explain a phrase or a sentence at a time, and pause. Slow down to 55 words per minute (and save!).
- Decide what prerequisite skills students need to successfully handle the material presented. Do your students have them?
- Write important phrases on the board as you say them. Seeing and hearing at the same time acts as a reinforcement.

Note-taking

- Print information on one side of the board at a time...walk to the other side and continue...come back to the first side and erase. Then, start all over. This gives the student a chance to copy as much information as possible. Make sure to print. Teach your groups how to outline, scan for key information and locate answers in the material.
- Emphasize important material in some texts with a colored "hi-lighter." Let your weaker students use the texts that you have thus outlined.
- Decide what material the student really must know and what material must be memorized. If a student understands a concept, he or she will retain it better than if it is simply memorized.
- If students are required to copy outlines or long passages, either from lecture or from the board, mimeographing the material helps.
- It may be easier for the student to memorize material if it is mimeographed than just in lecture form.
- It is helpful for the instructor and the student to have the five or ten main points of the lesson (phrases are enough) in front of them during the class. Mimeograph and leave plenty of room between each heading for the student's notes. Instructors might ask the student to keep these in a folder or notebook. This collection of notes gives students with poor memory and poor organizational abilities something to both organize their thinking and help them remember.
- Outline the work for the entire week, day by day, including pages to read, homework assignments, projects, and so forth.
- Demand organization from the students; folders with pockets are cheap and re-usable each term.
- Use a student that you know is a good notetaker for getting information to one who is not. Use carbon paper, xerox, etc.
- Tape your lecture.

- It is often difficult for students with learning problems to generate a procedure operation on their own. It is helpful to return to basic principles which are involved in each new procedure.

- Pictures in textbooks help the student to visualize and conceptualize. However, it may be necessary to coordinate the picture with the part of the text it represents. Color coding may be helpful in these cases.

- It is important to associate symbols with concrete examples. Flash cards can be used with picture examples.

- Asking students to visualize and possibly act out the steps in an operation may assist them in learning.

- The ability to read charts and graphs may be a skill the student has never acquired. It may be necessary to teach this concept as a separate skill.

- Reviewing daily and going back to already-learned ideas helps students with learning difficulties. It is surprising how fast students may forget what they seemed to know well.

Vocabulary

- Define terms in words as simply as possible. If one word in a definition is not understood, the whole meaning can be lost.

- Use operation definition. That is, "what is it used for" can be most effective. Remember to evaluate on this basis, too.

- Use the words in the context of the job or other related area so that specific examples stimulate interest and motivate the student to learn and remember. Make it funny or absurd to help memorizing. Example: quenching treated steel makes it harder and "not thirsty." Draw some steel drinking.

- Deal with new vocabulary by relating it to words and terms that have already been learned.

- Always place vocabulary in the context of a sentence or paragraph.

- Have students put new vocabulary into their own words and give examples: "Tina drew on the metal with a scriber."

- If applicable, show the language root of the word, and divide the syllables according to pronunciation.

Example: py rom et er - an instrument for measuring very high degrees of heat, as in a furnace or molten metal.

"John measured the temperature of the furnace with a pyrometer."

Pyro = fire Meter = measuring device

Examinations

- Recognition is easier than recall. Can you evaluate this way?
- Avoid essay questions, especially when there are students in the class with difficulties in writing effectively.
- Keep language simple and directions short. Avoid sentence structure which may be difficult to understand.
- Keep directions short, and repeat for each section.
- For fill-in questions, supply a word list. Students with learning difficulties often have word-remembering problems. They may know the concept and be able to recognize the word without being able to recall or spell it.
- For multiple choice, the longer component should be on the left and the shorter on the right.
- For worksheets dealing with essay answers, initially give page number beside questions. Gradually ease off on the numbering.

Skill Acquisition

- Doing things in sequence is often troublesome. Breaking down the sequences into smaller groupings may help.
- There is often difficulty in understanding basic directions such as left/right, clockwise/counter-clockwise, and turning things. It is better to use a fixed object in the room (windows, doors or other machinery) that a student can remember, rather than the designations "right" and "left." For example: "Move the wood toward the window."
- Occasionally, a student will have a problem with the coordination of the right and left hand, two-handed tasks, or tasks involving one hand for safety while the other pushes. Hand and finger positions could be pointed out, approximated and practiced. Tactile or other clues for hand and feet placement give extra help.

Behavior

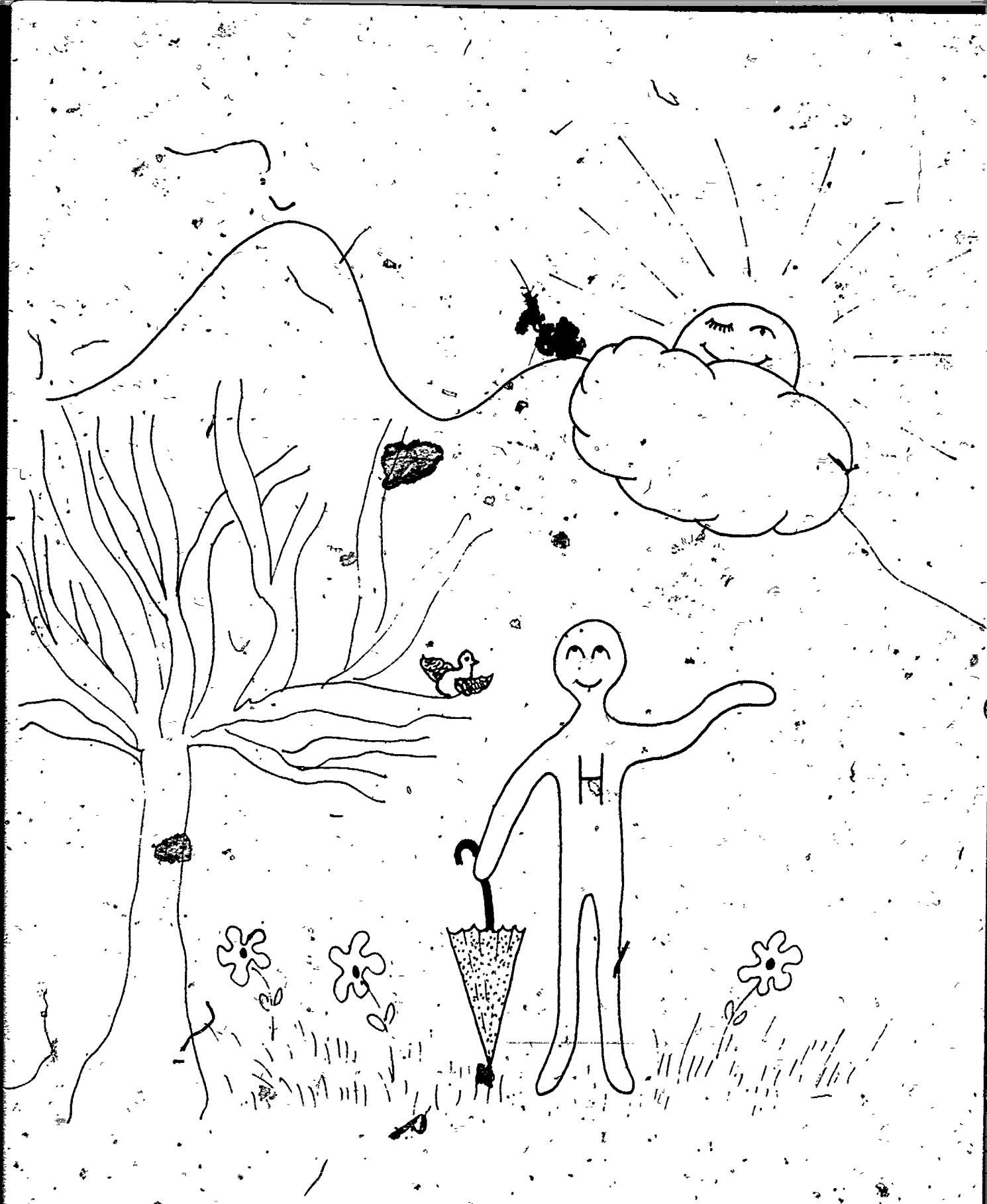
- Tell a student when he or she does something right, even when it is a small thing.

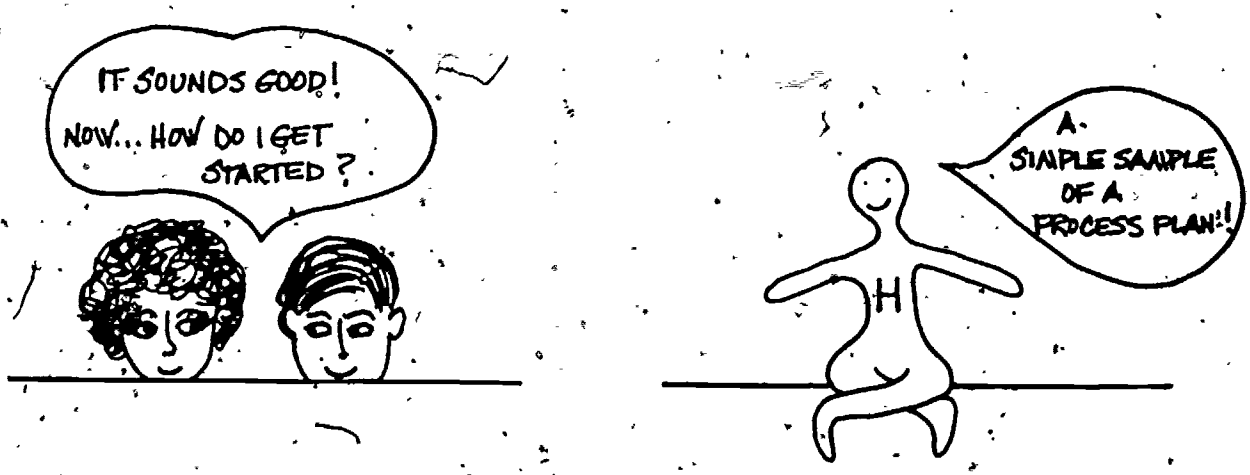
- Give praise for paying attention, eye contact, or other behaviors that are important to you. These might include good attendance or getting along with peers.
- Try to find a pattern to acting out behavior. Is it frustration with a particular type of task? Is it the level of difficulty of the class in general? Is it related to being grouped with certain students?
- Does the student get attention through inappropriate behavior?
- Is the student dependent on your approval?
- Set viable, tangible goals to use as rewards. Contract for them.
- Set up a buddy system for check-ups and approval.

Evaluation and Grading

- Use occupational readiness as a reward.
- Use progress and record charts.
- Try rewarding behaviors that are important (attendance, getting along with people) with a definite number of points toward the class grade.
- Reward affective behaviors like finishing work and paying attention, as well as cognitive behavior, like mastering course content.

The past few pages contain suggestions that instructors of special needs students have found to be helpful. They are here as points of reference for you. If you are interested, the Resource Section lists several publications related specifically to special needs students. In addition, the Recordkeeping and Evaluation components in the next section of the handbook give examples of techniques referred to here.





SECTION V

STEPS TO INDIVIDUALIZING A PROGRAM

DEVELOPMENT OF A WELL-ORGANIZED CURRICULUM

NEEDS ASSESSMENT

JOB FAMILY CLUSTERING

ANALYZING TASKS

CREATING INSTRUCTIONAL OBJECTIVES

SELECTING LEARNING EXPERIENCES

DEVELOPING EVALUATION TECHNIQUES

RECORDKEEPING AND FOLLOW-UP

PUTTING THE CURRICULUM COMPONENTS TOGETHER

DEVELOPMENT OF A WELL-ORGANIZED CURRICULUM

Every instructor has a curriculum. The issue we are dealing with here is its usefulness. That is, to whom is it useful?

Curriculum has two purposes. Primarily, it should be a plan or road map that outlines the student's and instructor's roles in the skill development process. Its second purpose is to communicate to parents, employers, school leadership and the citizenry exactly what can, or is to be accomplished in the instructional program.

Sound difficult? It is! Most instructors recognize that developing a good curriculum takes time, trial and error and continuous revision. This is especially so for those of you interested in creating or improving individualized instruction. Pace, strategies and objectives that will accommodate the needs of all students must be reflected in the curriculum.

Difficult, yes -- impossible, no. This section of the handbook will describe how to create the basic components of a well-organized curriculum. If you are an experienced instructor, you have already developed, to some degree, the components that will be described. This unit should help you to determine what components need attention in order to improve your curriculum. If you are a beginning or inexperienced instructor, it should provide you with the information necessary to develop a workable, well-ordered curriculum.

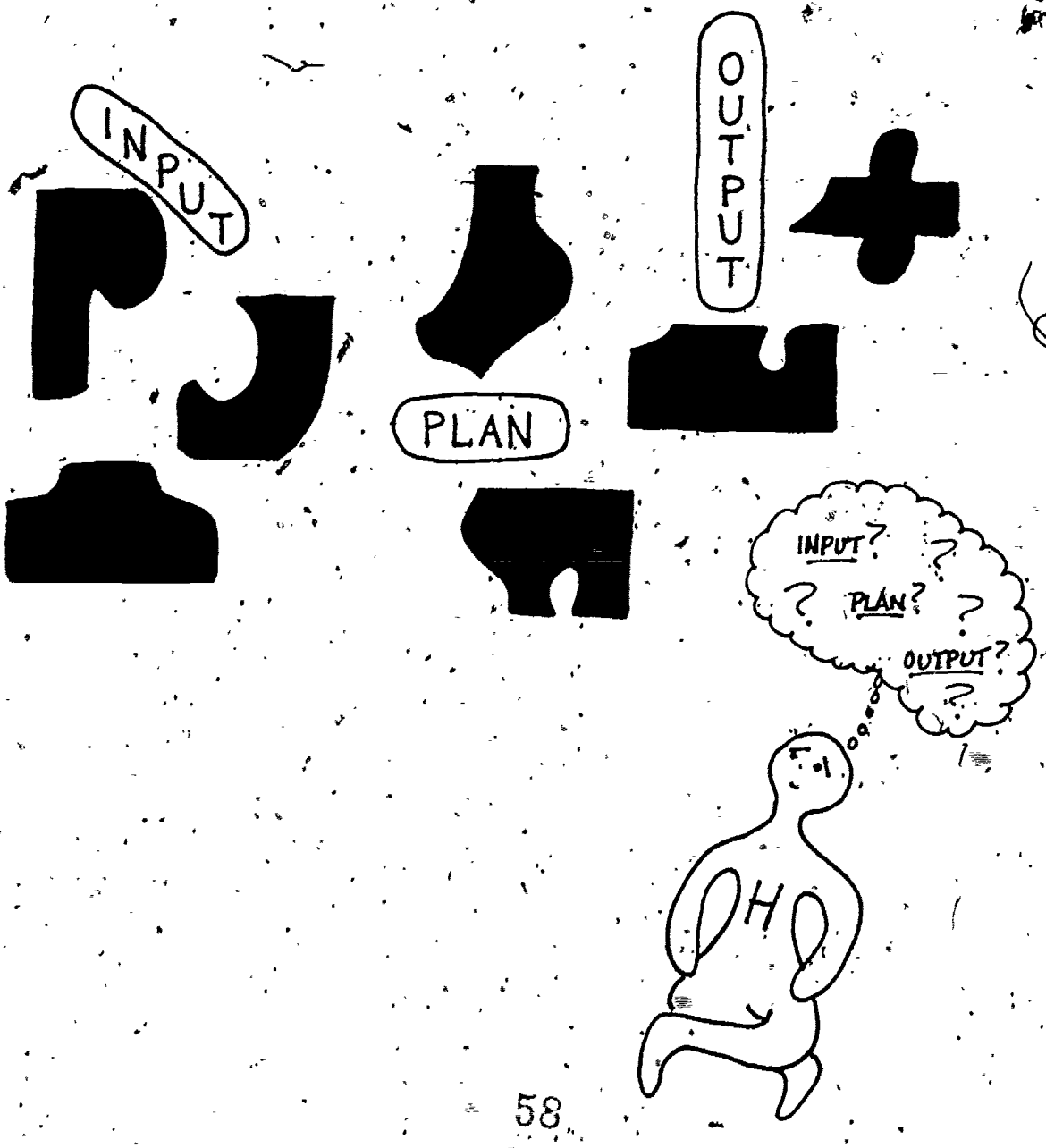
The following chart identifies the components referred to above and is divided into three parts:

PART 1 - Components needed prior to constructing the curriculum (INPUT).

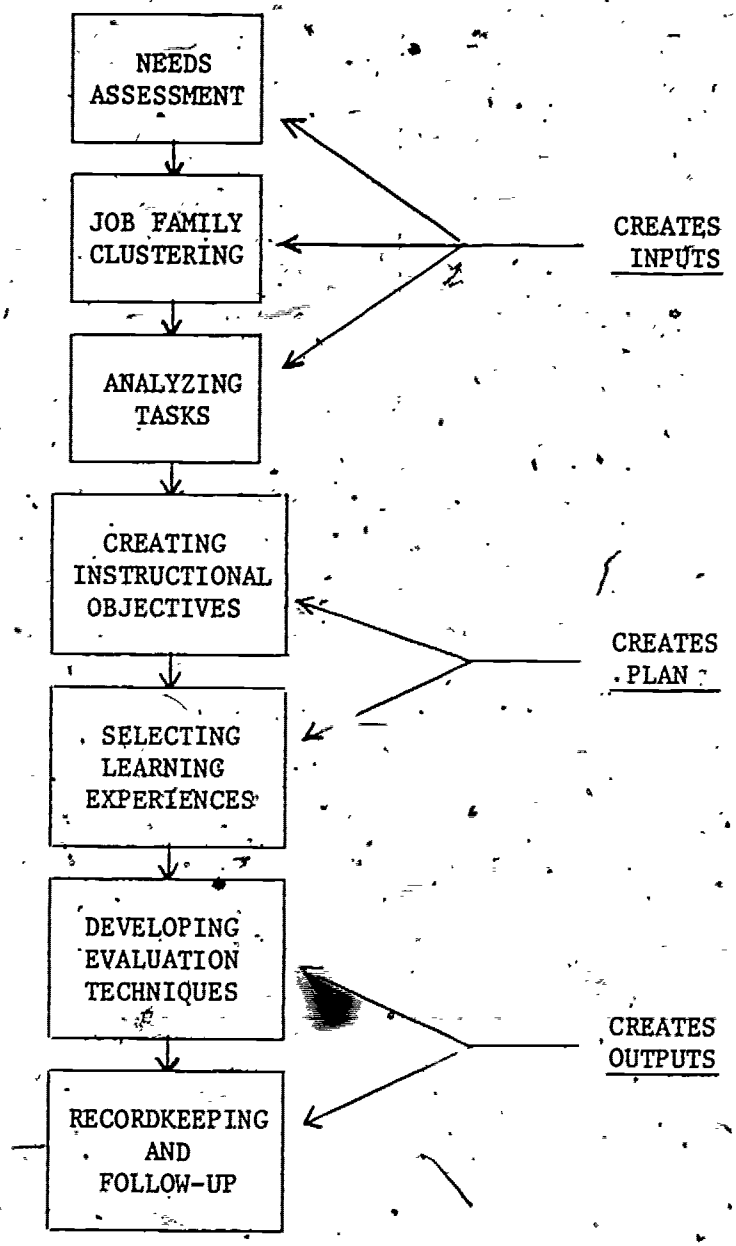
PART 2 - Components needed to construct the curriculum (PLAN).

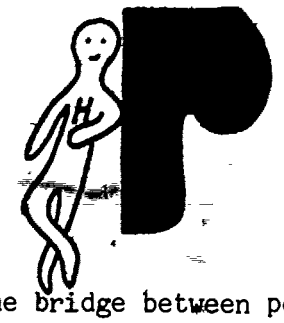
PART 3 - Components needed to measure and document the curriculum (OUTPUT).

Each component is discussed in detail, and is designed to allow you "hands on" exposure to produce and assemble each segment of the entire curriculum.



COMPONENTS OF THE VOCATIONAL EDUCATION CURRICULUM PROCESS





NEEDS ASSESSMENT

Vocational education has been described as "the bridge between people and work." Vocational instruction, therefore, must equip students with the skills necessary to allow them job entry into their chosen field upon completion of the program. Successful instruction relies upon the assessment of three issues:

1. the employment needs of the community, region and nation (JOBS)
2. the students' aptitudes, abilities, interests and needs as related to developing selected occupational skills (PEOPLE)
3. the facilities and resources in both the school and community to aid in accomplishing skill development in the identified occpational fields (INSTITUTIONS).

Have you ever addressed your program in this way? Even if you have, how long ago was it? It doesn't matter how well-developed your program is at this point; a good needs assessment may indicate that you should be considering some instructional changes.

To help you further, answer the questions regarding needs assessment on the following checklist. If you answer "no" to any of the questions, we would refer you to The New Hampshire Needs Assessment Handbook for Vocational Education Planning, developed in 1973 for instructors and administrators of New Hampshire schools. It will provide you with a detailed process plan to accomplish the necessary needs assessment and is available through the Research Coordinating Unit, Vocational-Technical Division of the New Hampshire State Department of Education. Each New Hampshire

vocational center also has a copy of this handbook. Ask your Vocational director where the handbook can be found in your center.

NEEDS ASSESSMENT CHECKLIST

Current data are available and used in the development of your instructional program in the following areas:

1. The manpower requirement in your occupational field for your community and/or region

2. Student characteristics:
   a. current enrollments and projections
   b. prerequisite learning (English, math, etc.)
   c. special needs requirements
   d. existence of sex role stereotyping
   e. attrition rates and causes
   f. student interests
   g. educational aspirations

3. Population characteristics of the community and/or region being served:
   a. income
   b. highest educational level completed
   c. population growth (rate of)

4. Follow-up surveys of previous graduates:
   a. were student prepared to enter chosen field(s)
   b. number entering occupations

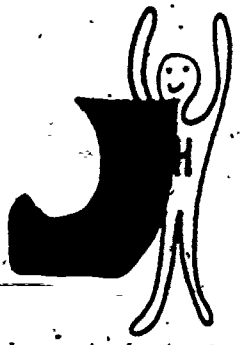
5. Are facilities considered adequate?

6. Does an improvement plan exist?

7. Is an advisory committee organized with validation of instructional content assured?

Remember, if you answered "no" to any of the above questions, we strongly urge you to get a copy of the New Hampshire Needs Assessment Handbook for Vocational Education Planning. See your Vocational director for a copy or write to the State Research Coordinating Unit. The remainder of this section is written with the assumption that you will be able to answer "yes" to all questions on the Checklist.

JOB FAMILY CLUSTERING



Assuming that Needs Assessment relating to jobs, student characteristics and instruction capability has been accomplished, you need to determine the range of training feasible in the instructional program.

Job Family Clustering means developing instructional content around a series of occupational titles having a common skill base.

Below is a list of the steps required to accomplish Job Family Clustering. Information is provided to help you understand the significance of each step that is listed. Worksheets and sample sheets are also provided to aid you in preparing your own cluster.

Job Family Clustering Process

Step 1 - Select the Job Family

What is the title of your program? Auto Services, Health Occupations, Office Occupations, Building Trades and Food Services are examples. See Sample Sheet #1.

Step 2 - Determine the Occupations in the Job Family

Using the following manuals, list all occupations in the job family that are feasible for the instructional program.

A. Dictionary of Occupational Titles (D.O.T.)
B. Vocational Education and Occupations
C. Occupational Outlook Handbook

See Sample Sheet #1.

The Dictionary of Occupational Titles can be found in most school libraries. The two-volume reference book contains titles and descriptions for thousands of occupations found in the United States. You will find that a nine-digit numbering system is used to identify each occupation. As you identify job titles from this source, also write the D.O.T.

number and the page number where the job description is found.

NOTE: All D.O.T. numbers found on the various Sample Sheets in the handbook have been referenced from the 1969 edition of the D.O.T. A new edition has just been published and should be available to you in the near future.

Vocational Education and Occupations can be acquired from your vocational director or through the State Department of Education consultant in your vocational area. This book is the U.S. Office of Education publication relating instructional programs to various D.O.T. occupations for which vocational training programs exist throughout the United States. Each occupation is placed in a program category and a number is assigned to each program.

Occupational Outlook Handbook is the U.S. Department of Labor publication that predicts job trends for most major occupational fields throughout the United States.

When the list is complete, relate your job needs information developed in the Needs Assessment component to your list. Determine whether each occupation will be included in your program. Write "yes" or "no" next to each occupation.

Step 3 - Organize Occupations According to Job Entry Level

Divide the listed occupations into three categories: Low, Middle and Upper Job Entry levels. Use D.O.T. numbers for each occupation. Write the categorized occupational titles on Worksheet #2. See Sample Sheet #2.

The cluster should contain successful skill development for students in a wide ability level. By developing a program that has a varied complexity in the skill base, a wide variety of students can be served.

Step 4 - Determine Occupations to be Included in Your Program

Review the materials gathered in the Needs Assessment concerning regional employment needs, student interest and aptitudes and institutional training facilities. Apply this information in selecting three to five (this will vary) occupations in each of the three Job Entry categories you listed on Worksheet #2. Circle these occupations on Worksheet #2. See Sample Sheet #2.

SAMPLE SHEET 1
Job Family Clustering

Step 1
Select the Job Family

Job Family: Auto Mechanics

Step 2
Determine Occupations in the Job Family

Occupational Title In Program	D.O.T. Number	U.S.O.E. Number	D.O.T. Job Description Page Number
Service Rep. Auto Mfg.	191.168	04.03	639
Salesperson Auto Retail	280.358	04.03	615
Auto Appraiser Retail	299.287	04.03	17
Service Station Attendant	915.867	04.16	33
Tire Repair Person	915.884	17.03	741
Mechanical Maintenance Person	620.281	17.03	460
Auto. Radiator Repairperson	620.381	17.0303	33
Auto Parts Specialist	223.387	17.03	33
Pump Attendant	915.867	17.03	33
Car Wash Supervisor	915.137	04.03	104
Brake Specialist	620.281	17.0308	73
Auto Electrician	825.281	17.03	240
Air Conditioning Mechanic	620.281	17.01	8
Gasoline Engine Repairperson	625.281	17.31	327
New Car Get-Ready Specialist	806.381	17.03	491
Lubrication Specialist	915.887	17.03	434
Automotive Mechanic Apprentice	620.281	17.03	33
Tune-Up Specialist	620.281	17.0303	763
Transmission Mechanic	620.281	17.0303	753
Front End Specialist	620.281	17.0303	317
Auto Tester	620.281	17.0302	33
Auto Accessories Installer	806.884	17.0303	32
Used Car Renovator	620.884 915.876	17.03	769

WORKSHEET 1
Job Family Clustering

Step 1
Select the Job Family

Job Family _____

Step 2
Determine Occupations in the Job Family

Occupational Title In Program	D.O.T. Number	U.S.O.E. Program Number	D.O.T. Job Description Page Number

SAMPLE SHEET 2
Job Family Clustering

Step 3
Organize Occupations according to Job Entry level

Step 4
Determine Occupations to be included in your program

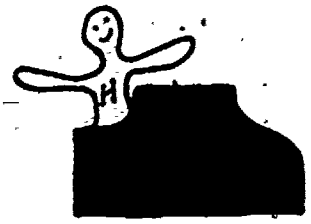
Entry level	Occupational Title	D.O.T. Number	U.S.O.E. Number
LOW	1. Service Sta. Att.	915.867	04.16
	2. Tire Repair Person	915.884	17.03
	3. Lubrication Spec.	915.887	17.03
	4. Pump Attendant	915.867	17.03
	5. Car Wash Supervisor	915.137	04.03
MIDDLE	1. Service Sta. Mechanic	620.381	17.03
	2. Brake Specialist	620.281	17.0303
	3. Auto Parts Specialist	223.387	17.03
	4. Front End Specialist	620.281	17.0303
	5. Tune-Up Specialist	620.281	17.0303
UPPER	1. Auto Electrician	620.281	17.03
	2. Apprentice Mechanic	620.281	17.03
	3. Transmission Mechanic	620.281	17.0303
	4. Air Cond. Mechanic	620.281	17.01
	5. Mechanical Maintenance Person	620.281	17.03

WORKSHEET 2
Job Family Clustering

Step 3
Organize Occupations according to Job Entry level

Step 4
Determine Occupations to be included in your program

Entry level	Occupational Title	D.O.T. Number	U.S.O.E. Number
LOW			
MIDDLE			
UPPER			



ANALYZING TASKS

A task is a unit of work that is part of the total job responsibility. A task statement is the written description of the actual work performed.

The skills training that you wish to achieve in an instructional program should be based upon the skills required for job entry in any given occupation. The skills are reflected in four levels:

Level 1	Duties	Major sub-divisions that have distinct identities within the overall job. A DUTY of an auto mechanic, for example, is an engine tune-up. Duties are composed of several distinct tasks.
Level 2	Tasks	Necessary to the performance of duties. A series of activities with a common purpose that occur in close sequence. An engine tune-up involves such TASKS as replacing points or setting timing.
Level 3	Activities	Necessary to the performance of tasks. A series of actions with a common purpose that occur in close sequence. Adjusting the dwell involves such ACTIVITIES as loosening the nut lock with a wrench or attaching a dwell meter.
Level 4	Actions	Necessary to the performance of activities. These are short, simple operations that are frequently common to many activities. ACTIONS involve using tools, devices, simple test equipment and so forth.

Duties are usually too broad, and activities and actions are too limited to allow for accurate measurement of student competencies.

The task level statement generally results in some type of product. A product can take the form of making a correct decision on the job. The task statement specifies both the action(s) performed and the object(s) to be acted upon.

Some examples of task statements are listed on the next page.

The auto body mechanic can:	1. Align front wheel 2. Install door glass 3. Weld or brace metal 4. Diagnose malfunctions
The nurse's aide can:	1. Greet patients 2. Record information 3. Make hospital beds 4. Maintain confidentiality
The data accountant can:	1. Process sales orders 2. Prepare invoices 3. Calculate payroll 4. Identify and correct errors

You may notice that it is helpful to use the word "can" prior to the task statement. "Can" is usually followed by the action performed.

Although the task statements are the important tools in listing the job role, the duty statements are those from which the task statements are derived. As you begin to break down any job role, list both the duties and the tasks.

The Sample Sheet that follows provides a further example of how duty and task statements should be written.

Now that you have a better understanding of what duty and task statements are, let's tie their function into the Job Family Clustering that you completed earlier. Follow the steps below:

1. Using Sample Sheet #2, created in the Job Family Clustering component, identify the single most complex occupation in the cluster. (We have selected Apprentice Auto Mechanic in our Sample Sheet #3.)

2. Fill out Worksheet #3, which contains all duties and tasks for the selected occupation. (Note: As a duty-task list is extensive, we provide only a single duty statement and the breakdown of tasks for that duty.)

3. As you look at the complete list of duties and tasks, ask yourself this question: does the duties and task listing for this occupation include all the duties and tasks for the low, middle and other high

entry occupations in your cluster? If you answered "yes," you should go on to Step #4.

If you answered "no," you will have to list the additional duties and tasks for each of the other occupations before going to Step #4.

Step 4. Using Sample Sheet #3 as a guide, number the tasks in the sequence that they will be presented in instruction. Re-write the tasks in this order on another blank Worksheet #3.

In some cases, instructors find that a single duty statement can be translated into an instructional unit title. The task statements form the basis for creating objectives. These objectives will be developed in the next unit.

Duties = Instructional Unit Titles

Tasks = Instructional Objectives

SAMPLE SHEET #3

JOB FAMILY Automobile Mechanic D.O.T. # 620.281

OCCUPATIONAL TITLE Apprentice Mechanic O.S.O.E # 17.03

DUTIES	TASKS	INSTRUCTIONAL ORDER
0.1 Maintains Suspension, Steering and Tires	Rebushes spring shackles	2
	Replaces complete spring	4
	Lubricates chassis	6
	Renews and spaces bearings	8
	Aligns wheels	10
	Services or replaces shock absorbers	12
	Changes leaves and springs	1
	Rebuilds spring shackles	3
	Repairs frame	5
	Rebushes and renews front pivot pins	7
	Overhauls and repairs steering gear	9
	Removes and replaces power steering pump assembly	11
	Repairs, services or replaces tires (mounts and demounts tires, repairs punctures, replaces valves, rotates tires, balances tires)	13
0.2 Maintains, Repairs, and Replaces Brakes	Repairs and replaces brake shoes	2
	Diagnoses brake problems	1
	Arcs brake shoes	4
	Turns brake drums	3
	Adjusts brake	5
	Rebuilds wheel cylinder	6
	Repairs and replaces master cylinders	8
	Repairs and replaces wheel cylinders	7
	Repairs and replaces disc brake caliper units	14
	Flushes brake system	15
	Rebuilds master cylinders	9
	Repairs, replaces and adjusts pressure differential valves	10
	Repairs and replaces vacuum power brake units	20
	Repairs and replaces air brake units	21
	Adds fluid to brake systems	22
	Repairs and replaces brake hoses/lines	11
	Repairs and replaces disc brake pads	12
	Turns brake rotor assemblies	13
	Bleeds brake system	16
	Repairs and adjusts parking brakes	17
	Tests proportioning valves	18
	Repairs antiskid braking devices	19

THIS IS A SAMPLE - NOT COMPLETE

SAMPLE SHEET #3.1

JOB FAMILY Automobile Mechanic D.O.T. # 620.281

OCCUPATIONAL TITLE Apprentice Mechanic U.S.O.E. #17.03

DUTIES IN SEQUENCE FOR INSTRUCTION	TASKS IN SEQUENCE FOR INSTRUCTION
0.1 Maintains Suspension, Steering and Tires	1. Changes leaves and springs 2. Replaces complete springs 3. Rebushes spring shackles 4. Rebuilds spring shackles 5. Repairs frame 6. Lubricates chassis 7. Rebushes and renews pivot pins 8. Renews and spaces bearings 9. Overhauls and repairs steering gear 10. Align wheels 11. Removes and replaces power steering pump assembly 12. Services or replaces shock absorbers 13. Repairs, services or replaces tires (mounts and demounts tires, repairs punctures, replaces valves, rotates tires, balances tires)
0.2 Maintains, Repairs and Replaces Brakes	1. Diagnoses brake problems 2. Repairs and replaces brake shoes 3. Turns brake drums 4. Arcs brake shoes 5. Adjusts brake 6. Rebuilds wheel cylinder 7. Repairs and replaces wheel cylinders 8. Repairs and replaces master cylinders 9. Rebuilds master cylinders 10. Repairs, replaces and adjust pressure differential valves 11. Repairs and replaces brake hoses/lines 12. Repairs and replaces disc brake pads 13. Turns brake rotor assemblies 14. Repairs and replaces disc brake caliper units 15. Flushes brake system 16. Bleeds brake system 17. Repairs and adjusts parking brakes 18. Tests proportioning valves 19. Repairs antiskid braking devices 20. Repairs and replaces vacuum power brake units 21. Repairs and replaces air brake units 22. Adds fluid to brake systems.

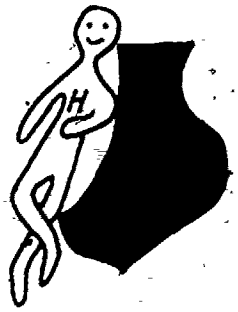
THIS IS A SAMPLE - NOT COMPLETE

WORKSHEET #3

JOB FAMILY _____ D.O.T. # _____

OCCUPATIONAL TITLE _____ U.S.O.E. # _____

DUTIES	TASKS



CREATING INSTRUCTIONAL OBJECTIVES

Now that we have determined the occupational base for the skills in the cluster, the skills must be reflected in the curriculum. You need to translate the duties and tasks developed in the previous unit into instructional objectives.

The terminology related to objectives can be confusing. At this point, it is suggested that you return to page 11 of the Glossary to review the terms listed under "Objectives," as most of these terms will be used in this section of the handbook.

The objective represents the performance level students must achieve before they can be considered competent. The terms "performance" and "behavioral" are similar; but as vocational objectives are derived from task statements, the term "performance" objective is most commonly used.

In this section, we will attempt to describe the three domains of objectives and the two levels at which they should be written. In a step-by-step process, we will guide you in translating the duty and task statements you have already created into the performance objective base needed in your instructional program.

If you are unfamiliar with writing performance objectives, you may want to review the additional information, entitled "Objectives," provided in the Supplementary Materials section of the handbook.

Three Domains

The aim of instruction should be to provide each student with the knowledge (or concepts) associated with the occupation, the manipulative skills (or doing) associated with the occupation, and the proper attitudes and values (or feelings) associated with the occupation.

In educational terms, the concepts or knowledge skills required of the occupation are called cognitive learning. The manipulative or doing skills are called psychomotor learning. The attitude, value or feeling skills are called affective learning.

A formal definition and an easy way to relate these terms are as follows:

A. Cognitive - all objectives concerned with the intellectual or mental behaviors of the learner.

B. Psychomotor - all objectives concerned with the physical behavior or manual dexterity of the learner.

C. Affective - all objectives concerned with attitudes, feelings, interests and values of the learner.

Cognitive	=	Concept	=	Knowing
Psychomotor	=	Skill	=	Doing
Affective	=	Value	=	Feeling

Performance objectives written for vocational job training usually center on the cognitive and psychomotor domains.

Students must be able to demonstrate both factual knowledge and specific skills in a given subject area. What is generally not addressed is the affective domain; and this area should not be overlooked. Vocational

education concerns itself with the training of skilled and competent technicians, with its primary goal being the ability to secure a good job upon successful completion of schooling.

Recent studies of employer needs here in New Hampshire, as well as other states, point out that affective or value learning is most important.

Employers state that attitudes are of primary importance in any job. Foremost are the learners' attitudes toward themselves and the work they are doing. Beyond that, what are the attitudes and feelings toward fellow-workers, authority figures (employers, supervisors, overseers), organizational policies and the consumers to be served? Ethics must be examined as well. A nurse's aide may be capable and efficient in the performance of duties, but if the uniform is wrinkled or if the aide freely discusses details of one patient's case with another patient, this is indicative of non-professionalism, poor ethics and ultimately, if not corrected, will threaten the job.

It is necessary, then, for every instructor to carefully analyze all three learning domains and develop instructional objectives that reflect each employment need.

Additional information on the three domains is included in the Supplementary Materials section under "Objectives."

Levels of Objectives

Objectives, when carefully written, will provide you with direction for selecting methods and materials, and a means to determine appropriate evaluation measures for students.

Two levels of objectives are considered useful in stating the performance(s) of the student. The interim objective is the statement of how

the instructor will measure the student during the process of learning. These statements are directly related to the task statements created in the last unit. For example, as an Auto Mechanics instructor, you might have the following sample interim objectives for a unit on exhaust systems. The student can, to the instructor's satisfaction, do the following:

a. Safely place a vehicle on a hoist
b. Inspect exhaust system for leaks
c. Remove defective exhaust parts
d. Determine needed parts and order
e. Install new parts

Look familiar? It is quite easy to translate your task list into interim objectives.

The terminal objective is the statement of how the teacher will measure the student at the end of the learning process. These objectives are quite comprehensive and may be related to a combination of tasks that make up the duty statements. Using the example of the exhaust system, the terminal objective might be stated as follows:

> Given an automobile and instruction, each student will inspect, list parts needed, order and install any new parts in vehicle exhaust system with 100 percent no leaks, according to manufacturer's specifications.

This type of objective may also look familiar as it may relate to your duty statement written in the last unit.

Now that you have an idea of the two levels of objectives, you might ask which is created first: The answer is: either. Some instructors find it easier to describe the end results of a unit of instruction (terminals) and then break it into the various components. Other instructors prefer to identify all the smaller pieces of an instructional unit (interims) and then write the one or more terminals that result.

Before you get too involved in writing any objectives, ask your department chairperson, vocational director or State Department consultant where you can obtain instructional objectives in your skill area that may already have been written by others. This does not prevent you from writing some of your own; however, it may provide you with most of your needs.

The Resource section of the handbook also directs you to sources of instructional objectives.

Before you begin to deal with the steps in objective writing, let's review by asking these questions:

1. Have you read the material in this section carefully?
2. Have you looked at the Glossary to gain an understanding of the terms associated with objectives?
3. Have you read the additional materials provided in the Supplementary Materials section concerning objectives?

If you answer "yes" to all three questions, you are ready to follow the steps in objective writing. If you have questions, read on; but keep in mind that these sources will probably aid you if you get confused.

Steps in Objective Writing

Earlier, we discussed the relationship between the duties and task statements and the two levels of objectives. The next steps are related to the Sample and Worksheets that follow. Perform each step on the Worksheet (you will have to reproduce a number of these sheets yourself) and you will have:

a. determined titles of instructional units

b. established all interim and terminal objectives for your program.

1. Write the duties and tasks created on Worksheet #3 (see Sample Sheet #3.1 - Tasks and Duties Sequenced for Instruction) in the left hand column of Worksheet #4.
2. Using the Magerian or ABCD Method of writing objectives (see Supplementary Materials section), write the terminal performance objectives for each task, placing these in the right hand column of Worksheet #4. (See Sample Sheet #4.1.)
3. When Step 2 is completed for all duties and tasks, review the instructional objectives to determine titles for the instructional units. (Remember, the duty statements may aid you in identifying appropriate unit titles.).

Developing the Instructional Skill Analysis Chart

The next "Sample" page contains a chart that is quite useful in illustrating the relationship between your selected occupations in the job family and the units of instructional content contained in your program.

To complete this chart, follow the steps below:

1. List the occupations, their D.O.T. and U.S.O.E. numbers in the appropriate columns on the chart. This list is taken from your final cluster created in Worksheet #1 in the Job Family Clustering component. Arrange your list so that the lowest entry occupation is at the top of the sheet.
2. Write your instructional unit titles on the diagonal lines at the top of the chart. If necessary, paraphrase the unit titles to fit on the diagonal lines.

3. Cross-reference each occupation listed with each unit title, identifying whether the instructional unit is required or optional for employability. Use R for required and O for Optional.

4. As some vocational programs, such as Office Occupations or Agriculture, are taught in more than one course, a block is provided above the unit titles to relate the appropriate course title or number to the unit skills.

When you have completed the chart, you now have created the basis for content of your instructional program. THE INPUTS ARE COMPLETE.

SAMPLE SHEET #4.1

INSTRUCTIONAL PROGRAM Auto Mechanics

DUTY AND TASK STATEMENTS	PERFORMANCE OBJECTIVES
Duty Statement	**Terminal Objective**
0.1 Maintains Suspension, Steering and Tires	Each student will, when given a series of automobile suspension, steering or tire problems, diagnose and describe procedure for correcting the problem, identify tools and equipment required, and estimate cost agreeable to manufacturer's and/or instructor's standards.
Task Statements	**Interim Objectives**
1. Changes leaves and springs 2. Replaces complete spring	Given an automobile with a broken spring or leaf, the student will disassemble, repair and/or replace bushing or other defects so when installed in the spring assembly, it works with 100 percent efficiency.
3. Rebushes spring shackles 4. Rebuilds spring shackles	Given a spring shackle requiring rebushing or rebuilding, the student will disassemble, repair and/or replace bushing or other defects so when installed in the spring assembly, it works with 100 percent efficiency.
5. Repairs frame	Given an automobile with a bent frame, the student will describe the procedure required to put the frame in original condition.
6. Lubricates chassis	Given three different model automobiles, each student will lubricate each vehicle according to the manufacturer's specifications.
7. Rebushes and renews pivot pins 8. Renews and spaces bearings 9. Overhauls and repairs steering gear	Given a malfunction in a power steering unit, each student will remove the unit diagnose the problem, repair, replace and test unit for proper working order.
10. Aligns wheels	Given an automobile with uneven front wheel tire wear, the student will diagnose and adjust the wheel alignment to manufacturer's specifications.

THIS IS A SAMPLE - NOT COMPLETE

WORKSHEET #4

INSTRUCTIONAL PROGRAM _____

DUTY AND TASK STATEMENTS	PERFORMANCE OBJECTIVES

INSTRUCTIONAL SKILL ANALYSIS CHART

Occupational Cluster _____

School _____

COURSE

OCCUPATIONS	D.O.T. NUMBER	U.S.O.E. NUMBER	Orient. & Shop Safety	Related Theory	Preventive Maintenance	Tires and Wheels	Exhaust System	Suspension System	Body Electrical	Charging System	Starting System	Engine Tune-up	State Inspection	Brake System	Steering System	Fuel System	Cooling System	Engine Overhaul	Clutch System	Transmission	Drive Line	Differential	Auto Accessories	Business Management	Human Relations
Service Station Attendant	915.867	04.16	R	R	R	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R
Car Wash Supervisor	915.137	04.03	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R
Pump Attendant	915.867	17.03	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R
Lubrication Specialist	915.887	17.03	R	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R
Tire Repairperson	915.884	17.03	R	R	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R
Service Station Mechanic	620.381	17.03	R	R	R	R	R	R	R	R	R	R	R	R	R	R	O	O	O	O	O	O	R	R	
Front End Specialist	620.281	17.0303	R	R	R	R	R	R	O	O	O	O	R	O	R	O	O	O	O	O	O	O	O	R	
Tune-up Specialist	620.281	17.0303	R	R	R	R	R	R	R	R	R	R	O	O	O	R	R	O	O	O	O	O	O	R	
Brake Specialist	620.281	17.0303	R	R	R	R	R	R	O	O	O	O	R	R	O	O	O	O	O	O	O	O	O	R	
Auto Mechanic Apprentice	620.281	17.03	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
Auto Electrician	825.281	17.03	R	R	R	R	R	R	R	R	R	O	O	O	O	O	O	O	O	O	O	O	O	R	
Transmission Mechanic	620.281	17.0303	R	R	R	R	R	R	O	O	O	O	O	O	O	O	O	O	R	R	O	O	O	R	
Mechanical Maintenance Person	620.281	17.03	R	R	R	R	R	R	O	O	O	O	O	O	O	O	O	R	O	O	O	O	O	R	
Air Conditioning Mechanic	620.281	17.01	R	R	R	R	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	R	O	R	
Auto Parts Specialist	223.387	17.03	R	R	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R	R	

R = REQUIRED
O = OPTIONAL

INSTRUCTIONAL SKILL ANALYSIS CHART

Occupational Cluster _____

School _____

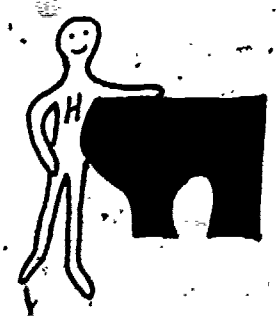
COURSE

INSTRUCTIONAL UNITS

	OCCUPATIONS	D.O.T. NUMBER	U.S.O.E. NUMBER

R= REQUIRED
O= OPTIONAL

SELECTING LEARNING EXPERIENCES



Learning experiences are the methods and media techniques that are used to accomplish the instructional objectives. Remember as you begin this process that there is no single method or media source that has magic for all students. With the student's input, you must decide what source(s) will match the individual student's learning needs, and still best achieve the performance objective.

There are four major considerations involved in selecting the most appropriate methods and media for each student:

SELF-ASSESSMENT
STUDENT ASSESSMENT
FACILITIES AND SCHOOL POLICY ASSESSMENT
SEX BIAS AND SEX-ROLE STEREOTYPING

Self-Assessment

Develop an inventory of your teaching techniques. Determine your strengths and weaknesses in the following areas:

a. Your teaching methods
b. Material you have developed and use successfully
c. Equipment you know how to use and have access to
d. Equipment you enjoy using
e. Your classroom organization
f. Other relevant areas

Student Assessment

Your activities must reflect student learning styles, interests, personality and attitudinal characteristics, and prerequisite learning achieved. Age and reading ability should also be considered. The following are student

characteristics you will want to consider.

A. Classroom

To what extent is each student interested in the subject and class activities? If the interest is low, why? What is the student enthusiastic about in his or her work? Is the student's interest level the same in your class as in other classes? What are the non-classroom activities of your student?

B. Problems

Students have a variety of problems with school, social situations, economic conditions, family and emotional situations. Think of each of your students and list any major problems of which you are aware.

C. Attitudes

Describe your students' positive and negative attitudes toward each of the following:

a. peers in your class
b. instructor's progress
c. academic progress
d. the subject you will be teaching
e. other relevant areas

D. General Information

a. what is the age of each student?
b. what is the reading ability or level of each student?
c. if there are key prerequisite skills needed by your class, describe each student's mastery of them
d. is each student able to work independently?
e. does the student hand in assignments on time?
f. does the student have any physical disabilities which might affect performance in your class?
g. other relevant areas

E. Learning Style

a. does the student learn best by using visual materials (e.g., pictures, charts, graphs, etc.)?
b. does the student learn best by using audio materials (e.g., tape recordings, listening to a lecture, etc.)?
c. does the student learn best from his or her peers?
d. does the student learn best by using audio-visual materials (e.g., film, slide-tape presentations, TV, etc.)?
e. does the student learn best from instructor-led discussion?
f. does the student learn best by reading?
g. other?

Facilities and School Policy Assessment

You are limited by the facilities and media available. Budget, time and school policy limitations are probably the most important aspects. Some of the facility and school policy concerns are listed below:

A. Administrative

a. field trips.
b. policies governing requisitions

B. Time

a. length of class period and number of meetings (per week? semester? year?)
b. non-instructional time available for instructor to develop materials.

C. Equipment and Space

a. equipment available in school or district
b. space for specialized use (e.g., small group discussions, lab work, etc.)
c. appropriateness of facilities (e.g., electrical outlets, darkening shades, quiet study areas, etc.)

D. Basic and Supplementary Resources

a. software - texts and other reference materials available in classroom, resource center and possibly community library
b. availability of modular or programmed instructional materials
c. individual workbooks associated with texts.

Sex Bias and Sex-Role Stereotyping - A New and Important Assessment

The three types of assessment described previously should be supplemented with a fourth type that affects written text and resource materials that may be used. Sex bias and sex-role stereotyping need to be assessed.

The following checklist will help you to select written materials appropriate to allow students to expand and balance the images of both sexes. This list is by no means complete; however, it should provide you

with some basic guidelines. Additional information may be obtained by contacting the Equal Access Consultant at the State Department of Education.

CHECKLIST

Do the media involved make both female and male students feel comfortable in learning about subjects which were formerly for one sex?

Do the media make a special effort to include pictures of male and female students, teachers and adults in non-traditional roles?

Do learning activities and projects avoid sex stereotyping according to past traditional roles?

Do the media point out that employers in occupations which formerly hired one sex are now required by law to employ the best qualified candidate regardless of sex?

Do the media for traditionally female occupations, such as health service or secretarial work, demonstrate that males have the right to pursue these occupations?

Do media on family relations, child care, housing, foods and nutrition, clothing selection, construction and design and management stress the personal needs of both males and females?

Do media for mechanical drawing, metals, plastics, electronics, woodworking, construction, machinery and agriculture point out to both males and females the advantages of acquiring training for the labor market and practical skills for daily living?

Do media dispel the myth that tools and power-driven machines are too dangerous for females to learn to use?

Do media demonstrate that females have the right to pursue activities or careers in non-traditional skills where physical strength is required?

The following questions refer to audio-visual materials:

Does the title have male or female connotation?

Is narration by male or female voices, or both?

Does the audio reflect male or female bias?

Do visuals portray males more often than females, or the other way around?

Are the main characters male or female?

In occupational settings, are adults seen predominantly male or female?

In school settings, are adults seen predominantly male or female?

Are characters cast in independent roles (making decisions, acting autonomously) predominantly male or female?

Are characters cast in aggressive roles (being competitive, dominating or leading) predominantly male or female?

Are characters cast in subordinate roles (being passive or acting under another's influence) predominantly male or female?

SELECTING THE ACTIVITIES

The next few pages are devoted to a list of methods or strategies that are commonly used by instructors to accomplish instructional objectives. Keeping in mind the four basic assessments presented above, review the list. Following your review, turn to Worksheet #5, which follows the Methods or Strategies list. In the left column of the Worksheet, write the instructional unit title. In the middle column, write the interim instructional objective taken from Worksheet #4 ("Creating Instructional Objectives" component). In the right column, write the title of the learning method or strategy selected for the accomplishment of the objective.

In the next section of the handbook, we will discuss Evaluation.

LIST OF METHODS OR STRATEGIES FOR CLASSROOM USE

	Definition	Use
AUDIO-VISUAL MATERIALS	an organized visual and audio presentation of information (software) that usually requires equipment (hardware) such as a 16mm film projector. (NOTE: see "Characteristics of Media" which is located in the Supplementary Materials section for specific help.)	can be used by individuals, small and large groups; can be locally produced by instructor or student; can be commercially produced; presents photographic reproduction of reality, enlargement of small print or pictures, provides for a variety of approaches; encourages active participation; varied learning activities stimulate high interest, lengthen the attention span and promote persistent effort.
BRAINSTORMING	group inter-action which allows individuals to express their opinions to the group without fear of criticism, to present ideas or to re-think previous ideas.	usually involves small group; permits differences of opinions; can lead to a plan of action; may have some time limitations.
CASE STUDY	a method of gathering information or researching about a certain person or situation.	provides for background information; usually involves small groups or an individual; can use interview techniques; may utilize visual devices, e.g., pictures, charts.
COOPERATIVE WORK EXPERIENCE	accomplishment of instructional content through actual job performance.	exposes student to learning experiences not feasibly accomplished in the school environment.
DEMONSTRATION	an organized planned performance of procedures and processes having at least two parts: a short preparatory period during which the purpose(s) of the demonstration is presented; and	may be used to demonstrate new skill experiments, etc.; may be for large and/or small groups; may be for an individual; may be for varied periods of time; may be presented by

	Definition	Use
	the actual performance which can include a verbal explanation.	the instructor or student(s) or both; may have follow-up period for practice of the process or procedures demonstrated; may use audio-visual materials.
DISCUSSION	group interaction in which individuals can express ideas, opinions and thoughts - even if not popular; listen to opinions of others; provides a means of seeking the ideas and judgments concerning the topic.	allows for differences of opinions; can be large or small group; no time limitations on discussion; provides opportunity for getting to know students; can follow a lecture; can stimulate new interests.
DRILL	repetition of concepts, words, mathematical formulas, and so forth, until they are memorized.	can be large group, small group or individual; may be either verbal or written; involves student response; can utilize other students in class.
FIELD TRIP	the opportunity to visit the resources in the surrounding community that are associated with the skill development process.	gives students direct experience with their chosen skill area; may lead to further interest, studies or projects; may be used with large or small groups.
GROUP WORK	a method of classroom organization in which a small group of students (usually 10 or less) with mutual learning objectives, assemble in a suitable place for a predetermined length of time; instructor serves as coordinator and/or leader; group's work must contribute to the total activities and objectives for the large group.	used so that groups may either receive instruction, work together on a project or interact in a non-directive manner to examine and discuss a mutual problem or situation.
GUEST SPEAKER	usually an available expert on material in a specific subject area.	usually for large groups; can assist in career decisions; usually informative and inexpensive; provides for better understanding of employer needs.

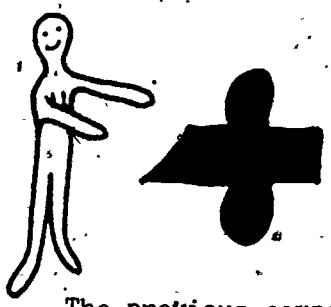
Definition	Use
MODULES/LEARNING PACKETS	
a sequential written or audio presentation of learning experiences based upon stated performance objectives; learning experiences are coupled with specified management procedures which allow for self-pacing, individual conferences with the instructor regarding progress and alternative assignments and/or materials, depending on individual characteristics and/or interests.	to accomplish non-sequential or sequential skills with little or no instructor involvement; good for educating students in self-reliance.
LECTURE	
an organized, verbal presentation of informantion.	can be used to introduce a unit of study; can be used for summarizing a problem for study; can provide information which is difficult for students to find themselves; involves some length of time (at least 15-20 minutes); may use visual devices.
OPEN LAB SEQUENCES	
teaching student skills or concepts through a self-instructional process that is sequenced to result in a specific knowledge; student reads directions and performs activities step-by-step until objective is accomplished.	supplements organized classroom learning; usually, participation is optional for the student; however, it may be used as a requirement.
PANEL DISCUSSION	
usually involves 3-7 students interacting on a central topic; provides a chance for members of the class to ask questions and/or make comments; refer to DISCUSSION for other characteristics.	creates a situation where interaction is suggested, if not demanded.
PROJECTS (TERM PAPERS, PROTOTYPES, RESEARCH PROJECTS, MODELS)	
a chosen or assigned topic in which the student researches and presents	provides a chance for the student to express his or her ideas and thoughts;

Definition	Use
the information to the instructor or to the class; can use audio-visual devices to present project.	provides an opportunity for the student to research a variety of topics; can create new interests; presents possibilities for researching the community, i.e.; finding available resources, interviewing leaders in the community, and so forth; can improve communication skills of the student; reinforces hand skill development.
QUESTIONS AND ANSWERS	
a period of time designated for content clarification and amplification with student-generated questions.	provides for clarification of new learning; responses can come from either the instructor and/or other students; time period for questions should last at least 15 minutes.
REVIEW/REINFORCEMENT	
an organized summary (using a variety of approaches) of key points of content which follows instruction.	may be verbal or written; may involve activities such as student practice, group projects; may be a short summary at the end of a lecture; may last longer than one class period; may be preparation for a test; involves student responses; can use a variety of visual devices.
ROLE PLAYING	
the practice or experience of being someone else; instructions can be provided as to how to play the role.	provides opportunity for student to increase insight into how a person may feel in a given situation; can provide data for an observing group; may be done with small or large group; may have time restrictions; can be fictitious role in which player is seeking to acquire an understanding of relationships or actions; has value for inter-personal and self-assessment development.

Definition	Use
SIMULATION GAMES	
a model or caricature containing a representation of reality (simulation) which utilizes role-playing and a game structure, with rules of play and a method of determining a winner or winners.	can present reality in a classroom; provides student an opportunity to cope with unpredictable circumstances; can teach social interaction; can involve large group, small group or individual; has time contraints; can illustrate the relationship between decision-making and its consequences; is extremely flexible; i.e., rules can be changed.
TEXT OR REFERENCE ASSIGNMENT	
usually reading and/or completing questions relevant to the topic of study.	can be used as a pre-introduction to a new skill; usually followed by lecture, demonstration and/or discussion.

SAMPLE SHEET #5

INSTRUCTIONAL UNIT TITLE	INTERIM OBJECTIVE (Identify by number or write out the objective)	LEARNING METHOD
Suspension, Steering and Tires	SAMPLE Given an automobile with uneven front tire wear, the student will adjust the wheel alignment to manufacturer's specifications.	Text Assignment Lecture Demonstration Discussion Project
	WORKSHEET SPACE	



DEVELOPING EVALUATION TECHNIQUES

The previous components of the instructional system have enabled you to:

a. identify and prescribe for your students what they must know or do regarding job entry level skills (TASK ANALYSIS and INSTRUCTIONAL OBJECTIVES);

b. provide students with an activity base from which to learn the skills (LEARNING EXPERIENCES).

The final and most important question is: how do you know whether the teaching and learning have been effective? To realistically determine this, your evaluation process must be related to the original performance objectives or criteria. It is important here to distinguish between criterion-referenced evaluation and the more commonly used norm-referenced evaluation.

> Criterion-referenced measures assess a student's performance in relation to a specific criterion or minimum competency standard. Norm-referenced measures assess a student's performance in relation to those of other students, with the same measuring device being employed for all students.

To help clarify these definitions, let's look at the following sample instructional objective:

> The student, when given conversion factors and tables, will convert English readings to metric readings and the reverse, with 90% accuracy.

If, when evaluating the student on a post-test, the instructor demands 90% accuracy from each student and records the student as having met that

standard, this is called criterion-referenced testing. If, however, a student's grade is determined by comparison with other students' and varies from 70% to 100% accuracy, this is called norm-referenced testing. Criterion-referenced testing, therefore, uses an absolute standard of quality, whereas norm-referenced testing uses a relative standard.

There is no way to tell a criterion-referenced test from a norm-referenced test by looking at the test. There is no reason, however, why a criterion-referenced test cannot be used as a norm-referenced test to eventually discriminate between students' level of mastery of objectives. In fact, this is usually necessary because of the grading required by most school systems.

Many instructors feel that a criterion-referenced evaluation conflicts with the letter grade system. This is not the case. The instructor sets the minimum quality and quantity standards to be accomplished for each objective, and the minimum competency level then represents a passing grade. Higher grades may be earned by performances that are above the requirements for minimum competency or by the accomplishment of more objectives.

If the instructional objectives are written relative to minimum employment standards for that occupation, then it is vital that each student be measured against that standard. Once that has been accomplished, the instructor can, if needed, develop a student-to-student comparison (norm-referenced) from which to compute grades.

Student comparisons can be made by measuring the following:

1. the number of attempts the student has to make before accomplishing the minimum standard
2. the amount of time the student takes to accomplish the standard

3. the difference in quality, above the standards, achieved by specific students

4. the number of instructional objectives completed over a given time frame (such as a marking period).

The next part of the Evaluation component discusses the types and methods that can be used to evaluate student performance.

TYPES AND METHODS OF EVALUATION

Instructors should evaluate students to determine if each can perform any given skill of an occupation at the standard acceptable to employers. Instructional objectives should reflect these standards.

If the student can perform at the minimum acceptable competency level, the instructor can be assured of the following:

a. desired learning has taken place; and

b. instruction provided the student during the learning process was effective.

Evaluation can be accomplished in a variety of ways. It also can (and should) be conducted a number of times throughout the learning process. Below, we have attempted to describe the four most commonly used types of criterion-referenced evaluation. A good instructional program will make use of all four.

Types of Evaluation

1. BEFORE LESSON/UNIT - Pre-test

This type of evaluation is diagnostic and prescriptive in nature. It allows the instructor and student to recognize, measure and incorporate the student's previous knowledge of the subject-matter contained in a given lesson or unit. Strengths and weaknesses can be pinpointed and, if necessary, appropriate modifications in curriculum made to meet the needs of the student.

2. WITHIN LESSON/UNIT

A. Feedback - This type of evaluation furnishes the student with feedback at designated times throughout the course of the lesson or unit. It is built into the structure of the curriculum.

B. Reinforcement - This is similar to Feedback, but its primary purpose is to reinforce the student's confidence in his or her capabilities to go on to closely related advanced learning.

3. END OF LESSON/UNIT - Post-test

This type of evaluation provides both the instructor and student with a prediction of the student's ability to successfully move on to the next learning experience. The new learning experience may or may not be sequential.

4. END OF COURSE - Final

This type of evaluation is comprehensive and is useful in determining how successfully the student will be able to apply what he or she has learned to on-the-job situations. It is also helpful in predicting student performance in advanced courses.

Methods of Evaluation

The choice of the evaluation method should be determined by the learning activity involved in the accomplishment of the instructional objective.

If a student's learning activities are primarily research, reading or answering assigned questions (usually referred to as the "knowledge" base), a paper and pencil test may be the most appropriate form of evaluation.

If, however, lab processes or "performance" learning activities are the prime modes of learning, then an observation checklist, rating scale or similar method may be the most appropriate form of evaluation.

In any skill evaluation, both the knowledge and performance methods are required. A student whose objective is to operate a bulldozer, circular saw or milling machine might be able to describe the process, name

the parts and so forth. The real competency, however, is in the operation of the equipment. A performance test, therefore, must also be given.

Listed below are descriptions and brief examples of common methods of evaluation.

1. Oral or Written Questions

Instructors use this method extensively. It should be used when the instructional objective and learning activities require the student to state factual answers to knowledge questions. Examples of this method are:

a. True-false
b. Sentence or phrase completion
c. Multiple choice
d. Matching
e. Short answer (usually two sentences or less)

2. Problem Solving

When the instructional objective and learning activities have required the student to assemble facts and determine the proper procedure or formula, the problem solving method of evaluation is appropriate.

An example of a problem solving test question might be:

Translate the following series of English measurements into metric equivalents:

1 inch	1 yard	$6\frac{3}{8}$ inches
1 foot	9 inches	$14\frac{1}{2}$ inches

Problem solving can be a written or performance test.

An example of a performance test question using the problem solving method might be as follows:

Using the tools and test engine provided, determine the malfunction in the electrical system, repair it and run the engine.

3. Comparative or Choice

When the instructional objective and learning activities indicate the student's need to compare or choose the best alternative process, this method can be used. Usually, students have to recall a series of facts analyzing and evaluating a given situation to derive the

most appropriate answer. This method is generally in written form; however, it can be designed as a performance test.

Which of the following layout methods would be appropriate to form a square-to-round duct, and describe the process you would use:

a. Radical Line
b. Parallel Line
c. Triangulation

4. Observation Checklist

When the performance criteria suggest that the instructor measure whether the student can or cannot do something and a quality rating is not required, an observation checklist is appropriate. This method is used most effectively with affective learning.

Example:

The student:

-- is a self-starter
-- can finish a task independently
-- can work through a process
-- can follow oral directions
-- can work with small or large groups

5. Rating Sheet

This method is used when it is important to determine not only minimum competency, but also the level above minimum competency that the student has achieved.

Example: Drilling holes in wood to accept a flathead woodscrew

Process	L	M	S
1. Identifies appropriate woodscrew for size and shape of wood.	☐	☐	☐
2. Identifies correct size and shape of woodscrews using a wire gauge.	☐	☐	☐
3. Selects appropriate pilot hold drill.	☐	☐	☐
4. Selects and uses appropriate countersink.	☐	☐	☐

A sample check mark indicating pass-fail may be used or, as in the example, use of L (Limited), M (Moderate) and S (Superior) helps to further define the level of student competency.

6. Contract Agreement

This is generally used for learning activities that require an extensive amount of time. It includes the objective(s), materials and resources to be used, the plan of accomplishment and the time agreement. All evaluation standards are discussed between instructor and student and should be written into the agreement.

Example:

CONTRACT AGREEMENT

Objective

Materials and Resources Required -

Student Plan

Completion Date

Evaluation Standards

Completion Date

Teacher Signature

Student Signature

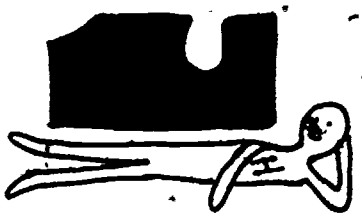
Date Completed _____

Instructor's Signature _____

Comments _____

Grade _____

RECORDKEEPING AND FOLLOW-UP



The last section described the necessity of evaluating students on the basis of criteria or objectives accomplished. Good recordkeeping should provide the instructor with the means to determine each student's ability to accomplish objectives. Specifically, the recordkeeping system can be used to identify:

a. Student mastery of a given objective
b. Objectives currently being accomplished by student
c. Objectives not yet attempted by student
d. Potential difficulties student may have in achieving objective(s)
e. Level of mastery; e.g., limited, moderate or superior
f. Number of student attempts at mastery
g. Time required to gain mastery
h. Instructor validation of student mastery of objective

Recordkeeping of student progress can be very time-consuming. For those instructors who feel that each of the above elements must be personally recorded, it is going to be more time-consuming than the traditional rank-book approach associated with the norm-referenced evaluation described in the previous unit.

If, however, you are attempting to create or improve individualizing in your instructional program, you already recognize the need to transfer more responsibility for student learning to the student. Why shouldn't the student have more responsibility in recording his or her own progress? In the list of recordkeeping needs, we have identified only three types of records that must be instructor-maintained. The instructor must:

a. Validate the student's mastery

b. Determine the level of mastery

c. Determine the possible potential difficulties

The remaining items can be recorded by the student, thereby removing considerable time contraints from the instructor.

Obviously, there is no one recordkeeping system that will satisfy the needs of all instructors. Each instructon has an obligation, however, to record:

a. the student's progress through the instructional objectives; and

b. the cumulative skills acquired at the completion of the program.

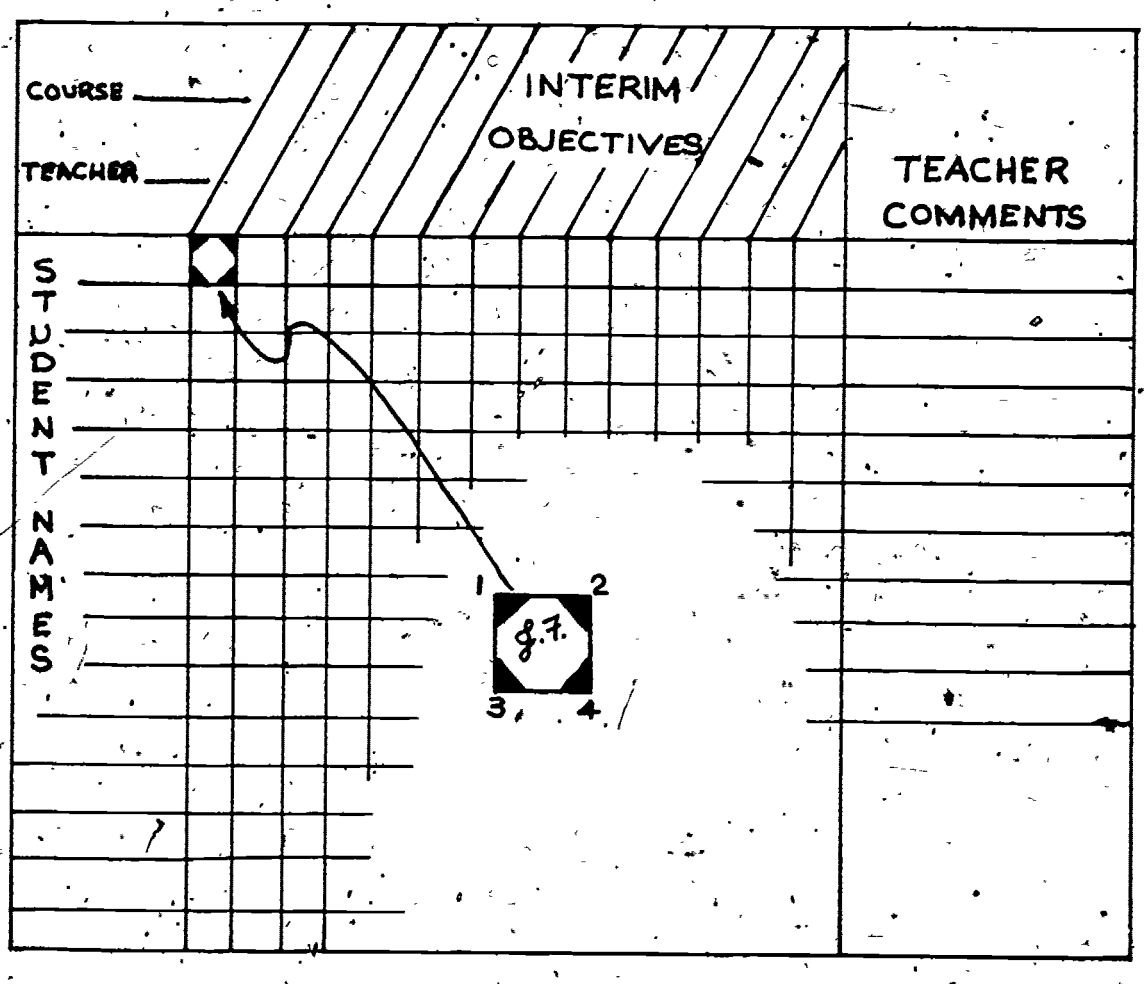
The remainder of this component provides you with three alternative examples of recordkeeping during the instructional process.

TYPE 1	Class Record
TYPE 2	Individual Record
TYPE 3	Project Evaluation Record

In addition, there is an example of a record indicating the student's cumulative skills upon completion of the program. This particular example is called an Occupational Readiness Record.

TYPE 1

A chart may be placed on the wall of the classroom. All student names are recorded alphabetically on the left.



Interim objectives, related to a unit objective sheet, are either numbered or paraphrased and placed along the top of the chart.

Each box has marks as shown. Mark 1 is recorded when the student initiates work on the objective. Mark 2 is recorded when the student has completed work on the activities associated with the objective. Mark 3 is recorded when the student has completed the performance evaluation. (Note: Marks 1, 2 and 3 are recorded by the student.) Mark 4 and the instructor's initials are recorded by the instructor.

TYPE 2

The chart described in Type 1 may be developed for each student and kept in a personal file folder. This folder is accessible only to the instructor and the individual student.

STUDENT _____ TEACHER _____ COURSE _____

OBJECTIVE	1	2	3	4	5	6	
	9/25	10/6	10/11	10/20	M	8.7.	COMMENTS

Although Types 1 and 2 are similar, the latter allows for confidentiality. This can be quite important in programs that emphasize affective learning. (See chapter on Objectives.) This type also allows the instructor to utilize candid comments. As in Type 1, the objectives are numbered and/or paraphrased on the left side of the chart. The student's name is written at the top. Column 1 indicates student initiation of the objective. Column 2 indicates completion of the activities. Column 3 indicates completion of the evaluation and Column 4 indicates instructor's validation. Notice that dates are used to record activities. This, rather than the symbolic marks used in Type 1, provides a better means of recording any degree of student difficulty encountered with a given objective. Column 5 can be used to establish the level of mastery. In this case, we are using three levels:

L = Limited

M = Moderate

S = Superior

Column 6 can be used as a sign-off column for the instructor.

TYPE 3

This form was developed by a Food Service program instructor. You will notice it has the same components described in Types 1 and 2, but contains more detailed information that can aid the instructor in arriving at a grade to accommodate school policy.

STUDENT PROGRESS AND EVALUATION FORM

STUDENT: ____________

UNIT: ____________

PROJECTS	EVALUATION: RECIPE #	QUALITY STANDARDS	TECHNIQUES	TIME	APPEARANCE	COLOR	CONSISTENCY	DONENESS	SHAPE	TASTE	TEXTURE	PROJECT AVERAGE	TRAINING STANDARDS	TEACHER SIGN OFF
											PROJECT AVERAGE			

SHEET #: ____________

OBJECTIVE: ____________

ASSIGNMENT: ____________

EXAM: ____________

SEE OTHER SIDE FOR QUALITY STANDARDS EXPLANATION

EVALUATION CODE

4. EXCELLENT
3. VERY GOOD
2. GOOD
1. FAIR
0. INADEQUATE

TRAINING STANDARD CODE

S.R. = SELECTION REQUIRED

R = REQUIRED

O = OPTIONAL

L.C. = LATE COMPLETION

S.I. = SHOWED INITIATIVE

N.A.S. = NO ASSIGNMENT SHEETS

EVALUATION AVERAGE

PROJECT AVG. ______

RELATED ASSIGNMENT ______

EXAM ______

UNIT GRADE ______

READINESS CARD

One [illegible] of the three examples of recordkeeping described here are utilized [illegible] maintained throughout the instructional process.

Instructors having experience with recordkeeping have found that any one of the described methods can also provide the student with an excellent permanent record that can be forwarded to employers.

The sample below is called an Occupational Readiness Record.

OCCUPATIONAL READINESS RECORD

TO THE EMPLOYER:

This occupational readiness record is both an inventory of the training course content and level of proficiency or achievement demonstrated by the graduate. Potential employers can obtain information about skills and knowledge the student has obtained by writing St. Johnsbury Academy. As a part of his training, the graduate has learned to expect appropriate instructions with each assigned task. He will expect and seek, supervision, assistance and direction where appropriate. Note that the job tasks as identified, are basic to the next higher or more sophisticated job level. Work experience and further training may qualify the graduate for more complicated tasks, a new job title and higher pay.

KEY TO PROFICIENCY CODE:

Level L: **Limited Skill**—does simple parts of task using required tools, but requires instruction and supervision to do most parts of the job.
Level M. **Moderate Skill**—requires help on some parts, but can use most tools and special equipment needed. Knows work procedures but may not meet minimum demands for speed or accuracy.
Level S: **Skilled**—understands operating principles and accomplishes all parts of task with only spot checks of finished work. Meets minimum demands for speed and accuracy.
All graduates receiving this document have satisfactorily demonstrated to the training staff their ability to work safely, understand and carry out instructions, and cooperate with other employees. This document also attests to their punctuality, reliability and general work habits.

ST. JOHNSBURY ACADEMY
St. Johnsbury, Vermont

L	M	S	
☐	☐	☐	Introduction/Safety
☐	☐	☐	Equipment Use/Care
☐	☐	☐	Techniques
☐	☐	☐	Lettering
☐	☐	☐	Geometric Construction
☐	☐	☐	Multi View Drawings
☐	☐	☐	Isometric Drawings
☐	☐	☐	Section Views
☐	☐	☐	Descriptive Geometry
☐	☐	☐	Auxiliary Views
☐	☐	☐	Developments
☐	☐	☐	Basic Dimensioning
☐	☐	☐	Mechanical Drafting
☐	☐	☐	Materials
☐	☐	☐	Castings
☐	☐	☐	Weldings
☐	☐	☐	Springs
☐	☐	☐	Master Parts List
☐	☐	☐	Dimensioning—Advanced
☐	☐	☐	Precision Measuring
☐	☐	☐	Fasteners
☐	☐	☐	Basic Electronic Drafting
☐	☐	☐	Identification of Components
☐	☐	☐	Basic Functions of Components

L	M	S	
☐	☐	☐	Schematic Drawings
☐	☐	☐	Basic Technical Illustration
☐	☐	☐	Leroy Lettering
☐	☐	☐	Isometric Views
☐	☐	☐	Perspective Drawing
☐	☐	☐	Air Brush Work
☐	☐	☐	Civil Drafting/Surveying
☐	☐	☐	Kinds of Maps
☐	☐	☐	Stereoscope Study
☐	☐	☐	Plotting
☐	☐	☐	Chain Practice (Field)
☐	☐	☐	Plotting w/ Transit
☐	☐	☐	Topographic Map Drawing
☐	☐	☐	Topographic Field Work w/Level
☐	☐	☐	Architectural Drafting
☐	☐	☐	History of Architecture
☐	☐	☐	Major Considerations
☐	☐	☐	House Construction
☐	☐	☐	Doors/Windows/Fireplace/Study
☐	☐	☐	Stairs
☐	☐	☐	Floor Plans Layout
☐	☐	☐	Elevations
☐	☐	☐	Pictorial View

VOCATIONAL DRAFTING

Name

Soc Sec. No.

Length of Training

Certified by
Instructor

PROMPTNESS
Usually Prompt | Almost Never Late | Always Prompt

RESPONSIBILITY
Not Very Reliable | Assumes Responsibility | Exceptionally Reliable

INITIATIVE
Needs Considerable Supervision | Needs Little Supervision | Always Finds Extra Work To Do

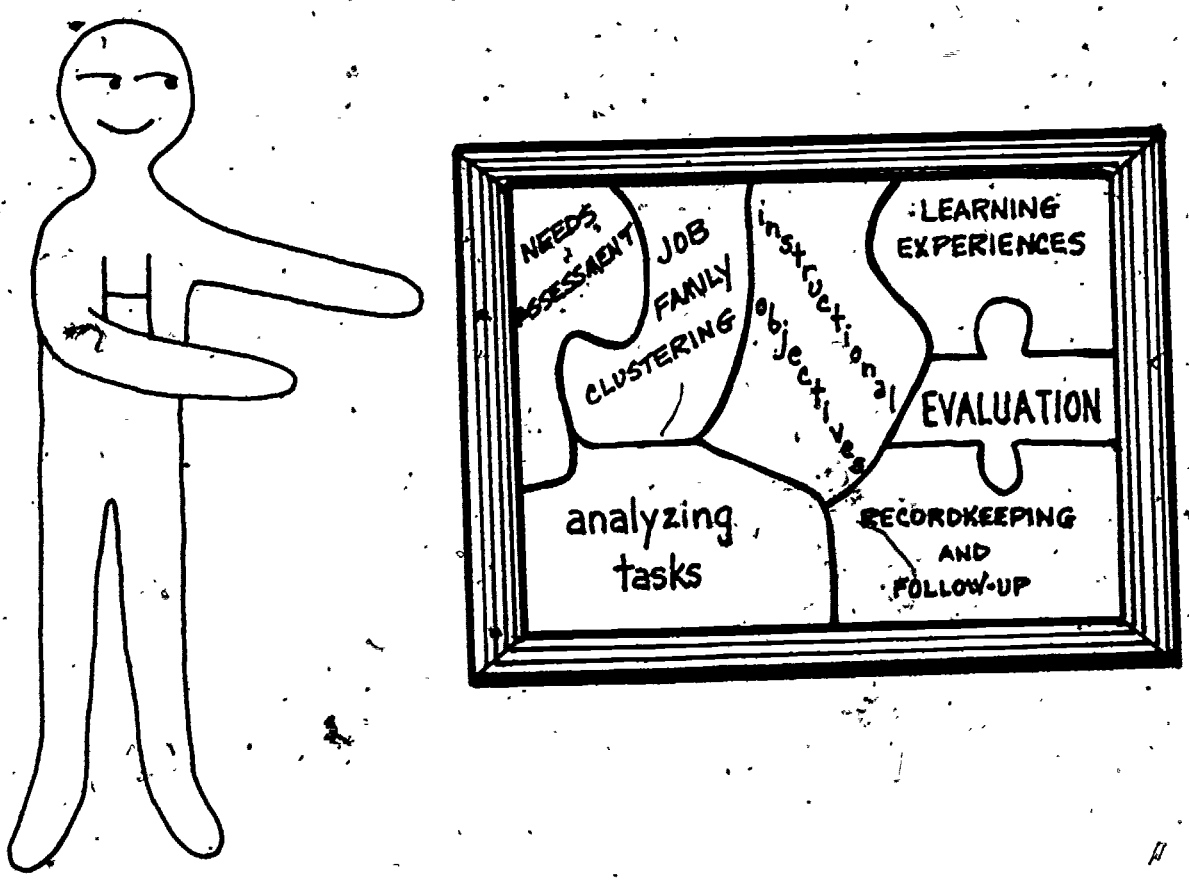
APPLICATION
Indifference | Average Application | Puts Extra Effort Into Work

ACCURACY
Often Inaccurate | Better Than Average | Rarely Makes Mistakes

At the completion of the occupational training program, the instructor completes the card. Usually, a minimum of three copies are created. One card is given to the student for use in job interviews. One is placed in the student's permanent records, and the final copy is kept by the instructor for future use in providing student recommendations to employers.

Notice that the Readiness Record not only provides information on the skill competencies of the student, but also includes the student's aptitudinal characteristics.

As stated initially in this section, there is no one system that can accommodate every instructor or program. What has been provided here is an explanation of the recordkeeping component and its relationship to a good instructional program. If individualizing is your goal, a good record-keeping system is a must.



PUTTING THE PIECES TOGETHER!

PUTTING THE CURRICULUM COMPONENTS TOGETHER

At the beginning of this section, it was indicated that curriculum has two purposes. First, it is a plan for establishing the student and instructor roles in the skill development process. Second, it is to communicate to other interested people what is being accomplished in the instructional program. You must keep these two purposes in mind as you assemble your curriculum.

The curriculum components were divided into three parts: Inputs, Plan and Outputs. Below are items from each part that should be found in a curriculum, as well as a series of suggestions as to their sequence and form.

Part 1 INPUT

A. Current job needs in the local, regional and possibly the national employment market

Data collected in the Needs Assessment component should be written in a narrative form. This information should appear first in the curriculum.

B. Titles and descriptions of jobs selected for the instructional program

Job titles and descriptions derived from the Job Family Clustering component should appear next in the curriculum. These sheets should be titled and referenced according to the Dictionary of Occupational Titles (D.O.T.). The actual job descriptions may be copied from the D.O.T., if applicable; or you may adapt such descriptions to your needs by putting the definitions in your own words.

C. A list of competencies students will be responsible for in the instructional program

This list should be derived from the duties and task statements as described in the Analyzing Tasks component.

D. Skill Analysis Chart

The chart showing the occupational titles and instructional skill units developed in the Creating Instructional Objectives component should be included at this point.

Part 2 PLAN

A. Terminal and interim instructional objectives

B. Alternative learning activities

C. List of evaluation methods related to instructional objectives

These three items should be derived from the Creating Instructional Objectives component, the Selecting Learning Experiences component and the Developing Evaluation Techniques component.

These may appear on separate sheets; however, as they are relevant to each other, it is suggested that they be assembled together on a three-column document. This document is particularly suitable for use by the student, as it presents, in a clear and concise format, the work that is entailed in any given unit of instruction. A sample of this style of composition is shown here.

PROGRAM _____

UNIT _____

TERMINAL AND INTERIM OBJECTIVES	ALTERNATIVE LEARNING ACTIVITIES	EVALUATION METHOD

Also shown is an item that is useful, if not a must for the instructor. This consists of a lesson or unit plan, related to the interim objectives, that describes the sequence of instruction, the instructor's role and the resources required to carry out the instructional activities.

It is shown here separately, as the information it contains is not directly relevant to student needs. The information on this sheet, however, may be combined with the three-column sheet described previously.

PROGRAM _____

UNIT _____

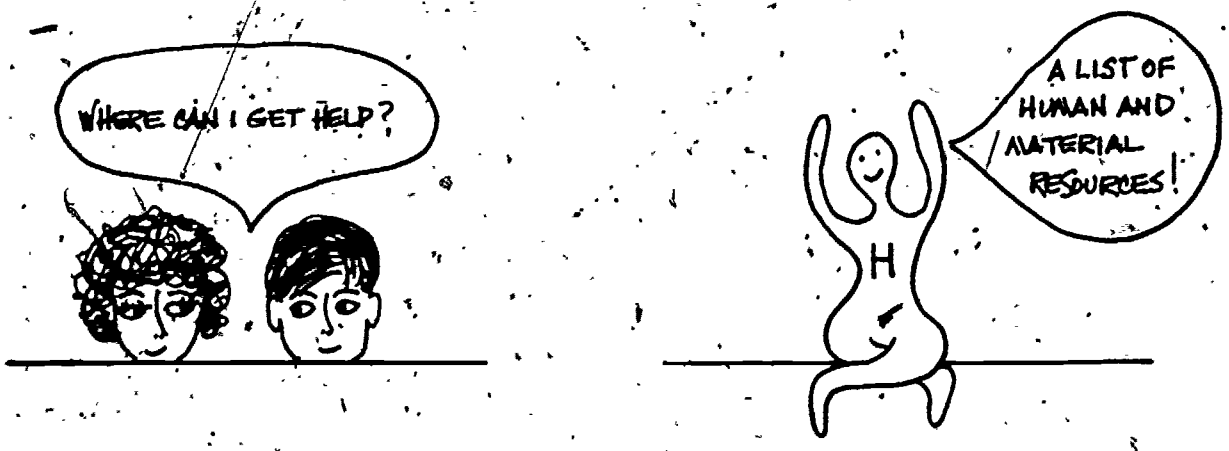
INTERIM OBJECTIVE NUMBER	INSTRUCTIONAL PLAN	RESOURCES

Part 3 OUTPUT

A. Student Progress Record

B. Occupational Readiness Record

Both these items should have resulted from your work in the Recordkeeping and Follow-up component. A sample Progress Record and Occupational Readiness Record could appear in your curriculum with a brief narrative describing how they are used in the instructional process. This is most helpful to any person interested in reviewing your curriculum.



SECTION VI

RESOURCES AND BIBLIOGRAPHY

RESOURCE SECTION

In the following section, we attempt to provide you with a wide range of additional sources of information: people, places and things. "Resources" is broken down into six sub-sections:

Model Programs and Approaches

Information and Resource Centers

Handbooks

Catalogues

Books and Other Publications

Special Needs

Throughout the section, there is a column entitled "Who or Where to Contact." We hope this will facilitate any efforts on your part to further explore individualized instruction. Where possible, we have included prices for the materials or publications.

All persons listed in the Model Programs and Approaches section invite contact and will arrange site visitations for those interested in following up a particular program.

Several of the publications listed are distinguished by either * or **. The key is as follows:

* Document available on loan basis from the Occupational Education Resource Center, University of New Hampshire, Durham, NH 03284

** Document available on loan basis from the Learning Resource Center, Keene State College, Keene, NH 13431

RESOURCES

SECTION	WHO OR WHERE TO CONTACT
MODEL PROGRAMS AND APPROACHES	
Child Care - Salem High School Vocational Center, Salem, New Hampshire (Individual Learning Stations)	Ms. Nancy Chase Ms. Lori Leone
Culinary Arts - Dover High School Vocational Center; Dover, New Hampshire (Learning Packages, Individualized Student Evaluation)	Mr. Doug Coons
Electronics - Nashua High School Vocational Center, Nashua, New Hampshire (Modular Instruction)	Mr. Bob Reynolds
Power Mechanics - Plymouth Area High School Vocational Center, Plymouth, New Hampshire (Dart System, Learning Packages, Student Teams)	Mr. Tim Peters
"Project Bridges" - Somersworth High School Vocational Center, Somersworth, New Hampshire (Cooperative work experiences through community-school agreement)	Ms. Susan Klaiber
Vocational Drafting - St. Johnsbury Academy, St. Johnsbury, Vermont (Activity Packages)	Mr. John Nelson
Welding Processes - New Hampshire Vocational Technical College - Manchester, New Hampshire (Open Labs)	Mr. Mel Ciulla
INFORMATION AND RESOURCE CENTERS	
Twin State Educational Information Center State Department of Education Concord, New Hampshire 03301 (ERIC/AIM/ARM)	Mr. Robert Trombley
Learning Resource Center (LRC) Mason Library Keene State College Keene, New Hampshire 03431	Ms. Dorothea Kitlan

SECTION	WHO OR WHERE TO CONTACT
Occupational Education Resource Center (OERC) University of New Hampshire Durham, New Hampshire 03824	Dr. Nick Paul
Research Coordinating Unit (RCU) Vocational Technical Division State Department of Education 105 Loudon Road Concord, New Hampshire 03301	Mr. Richard Monteith
The Northeast Network for Curriculum Coordination Bureau of Occupational Research Division of Vocational Education 225 West State Street Trenton, New Jersey	Mr. Gordon F. Law, Jr.
Minnesota Instructional Materials Center (MIMC) 3300 Century Avenue White Bear, Minnesota 55110	Dr. William Knaak

HANDBOOKS

Career Exploration and Skills Development: The Community Training Site Method. (A useful and practical guide for educators interested in developing community training site programs.)	Ms. Susan Klaiber Somersworth High School Memorial Drive Somersworth, NH 03878
Conducting a Labor Needs Analysis - A Guide for Educators.	Same as above
* Handbook for the Development of Vocational Education Modules. 1975	Curriculum Development Center University of Kentucky Lexington, KY
Handbook for Managing Individualized Learning in the Classroom. Champagne, David W. and Goldman, Richard M. 1975	Educational Technology Publications Englewood Cliffs, NJ 07632
Handbook for Vocational Instructors Interested in Competency Based Instruction.	MIMC - address in previous section
Handbook of Curriculum Design for Individualized Instruction - A Systems Approach. How to Develop Curriculum Materials from Rigorously Defined Behavioral Objectives. Drumheller, Sidney J. 1971 ($8.95)	Ed. Tech. Publications Englewood Cliffs, NJ 07632

SECTION	WHO OR WHERE TO CONTACT
** Individualized Instructional Systems for Vocational and Technical Education: A Series of Instructional Modules. Frantz, Nevin R., Jr. 1974	Vocational Instructional Systems Athens, GA
New Hampshire Needs Assessment Handbook for Vocational Education Planning. Severance, Melvin and Gustafson, Richard.	New Hampshire RCU address in previous section
The Vocational Educator's Guide to Competency-Based Personalized Instruction.	Project H.O.P.E. Minnesota State Department of Education St. Paul, MN
Using the Dictionary of Occupational Titles as a Source of Occupational Information.	Mr. Wiley B. Lewis Curriculum Materials Development Curriculum Materials Service Department of Voc Ed College of Professional Studies Ft. Collins, CO 80523
CATALOGUES	
A Catalog of Instructional Materials from AAVIM (American Association for Vocational Instructional Materials). Includes selection of publications, audio-visual sets, slide sets, transparency masters and sets.	AAVIM Engineering Center Athens, GA 30602
Book List and Order Form	Ed. Tech. Publications 140 Sylvan Avenue Englewood Cliffs, NJ 07632
Catalog (Instructional Materials) Approximately $2.50 per subject area package	Instructional Materials Lab Department of Practical Arts and Voc Tech Education University of Missouri at Columbia 8 Industrial Ed Building Columbia, MO 65201
Catalog (Vocational Education Media)	Vocational Education Media 10 Tillman Hall Clemson University Clemson, SC 29631

SECTION	WHO OR WHERE TO CONTACT
** Catalog (Instructional Objectives)	Instructional Objectives Exchange Box 24095 Los Angeles, CA 90024
Color/Sound Filmstrips (Vocational and Industrial Education) Order Form and Free 15-day preview	Bergwall Publications, Inc. 839 Stewart Avenue Garden City, NY 11530
** Curriculum Materials for Vocational (Technical, Special Needs, Career) Education.	NJ Voc-Tech Curriculum Rutgers University 4103 Kilmer Campus New Brunswick, NJ 08903
Educators Guide to Free Films (Filmstrips, Tapes) - revised annually	Educators Progress Service Randolph, Wisconsin
Florida V-Tecs Catalogs and Training Materials	Dissemination & Diffusion Branch Bureau of Vocational Research Dissemination and Evaluation Division of Vocational Education Florida Dept. of Education 426 Collins Building Tallahassee, FLA. 32304
New Hampshire State Agencies Media Directory	Copies available from: Participating agencies, Public Libraries, Supervisory Union Offices of the Public Schools.
Howard W. Sams Educational Materials (Catalog of Textbooks and Audio-Visual Materials) for Industrial Arts, Vocational, Occupational, and Career Education.	Bobbs-Merrill Educational Publishing 4300 W. 62nd Street Indianapolis, Indiana 46206
* Individualized Instruction Resource Guide 1976	Rhode Island Dept. of Education Division of Development and Operations Providence, RI
Individualized Learning Materials	Westinghouse Learning Press Department CC-973 PO Box 10680 Palo Alto, CA 94303

SECTION	WHO OR WHERE TO CONTACT
Instructional Materials for Trade, Industrial and Technical Occupations.	Instructional Materials Lab Trade & Industrial Education Ohio State University 1885 Neil Avenue Columbus, OH 43211
Instructional Materials for Vocational-Industrial Education.	Vocational Instructional Services F.E. Box 182 Texas A & M University College State, TX 77843
* NCHEMS Products - A Description of Publications, Computer Software and Video-Cassettes. 1976	The National Center for Higher Education Management Systems Boulder, CO
Vocational Education Curriculum Materials Non-Colorado Price List & Order Form.	Curriculum Materials Service Vocational Education Building Colorado State University Ft. Collins, CO 80523
Vocational Education Curriculum Specialist VECS (Instructional Modules)	Vocational-Education Curriculum Specialist - VECS American Institutes for Research Palo Alto, CA

BOOKS AND OTHER PUBLICATIONS

* A National Annotated Bibliography of Curriculum Materials in Vocational and Career Education. 1976	Illinois Board of Voc Ed and Rehabilitation Division of Voc Tech Education Springfield, IL
** Developing Vocational Instruction. Mager, Robert F. and Beach, Kenneth M., Jr. 1967. ($2.50)	Fearon Publishers Lear Siegler, Inc.-Ed. Division 6 Davis Drive Belmont, CA 94002
Development of Performance Objectives and Criterion-Referenced Measures for V-TECS Project Areas - Final Report. 1975.	Curriculum Development Center University of Kentucky Lexington, KY
** Evaluating Occupational Education and Training Programs. Wentling, Tim L. and Lawson, Tom E. 1975 ($11.95)	Allyn & Bacon, Inc. Boston, MA
** Individualized Instructional Systems For Vocational & Technical Education: A Collection of Readings. Frantz, Nevin, Jr. (Editor) 1974 ($7.50)	Vocational Instructional Systems PO Box 5422 Athens, GA 30604.

SECTION	WHO OR WHERE TO CONTACT
** Instructional Systems Development for Vocational & Technical Training. Butler, F. Coit. 1972 ($12.95)	Ed. Tech. Publications Englewood Cliffs, NJ 07632
* Job Corps Training Standards - Tasks and Knowledges of Jobs.	U.S. Dept. of Labor's Job Corps U.S. Department of Labor Washington, D.C.
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SECTION	WHO OR WHERE TO CONTACT
Instructional Development for Special Needs Learners - An Inservice Resource Guide. Phelps, L. Allen	Department of Voc and Tech Ed. University of Illinois at Urbana-Champaign Urbana, IL 61801
** Methods, Techniques & Learning Activities for Use with the Disadvantaged. Thomas, Edward G. & Omvig, Clayton P. 1971	Kentucky RCU University of Kentucky Lexington, KY
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** Vocational Education: A New Dimension for the Gifted & Talented Student - A Vocational Teacher's Resource Guide. Stone, Thomas. 1976	Educational Research and Services Center University of South Dakota Vermillion, SD
Vocational Education for Students with Special Needs: A Teacher's Handbook. Altfest, Myra. 1975	Vocational Education Dept. Colorado State University Fort Collins, CO
Vocational Instructional Materials for Students with Special Needs. Towne, Douglas and Wallace, Sydney.	D.C. Towne Special Needs Project N.W. Regional Educational Lab 710 S.W. Second Avenue Portland, OR
** Vocational Reading Power Project - Training Package.	New Hampshire Facilitator Center 80 South Main Street Concord, NH 03301
Guidelines for Nonsexist Use of Language in NCTE Publications. (1-15 copies free; more than 15, 6¢ each prepaid, ask for Stock No. 19719.)	National Council of Teachers of English 1111 Kenyon Road Urbana, IL 61801

SECTION VII

SUPPLEMENTARY MATERIALS

DESCRIPTION OF PARTICIPATING PROGRAMS

ADMINISTRATORS AND CONSULTANTS

OBJECTIVES

CHARACTERISTICS OF MEDIA

USE OF REFERENCES

DESCRIPTION OF AAIVE PROJECT

PARTICIPATING PROGRAMS

School: Salem Vocational Center
Program: Child Care
Instructors: Nancy Chase, Lori Leone

A full-time day care program is operated within the school, providing students with daily hands-on experience with pre-school children. The Child Care center is designed with 13 learning stations. Students accomplish instructional objectives individually while working with pre-school children in each of the learning stations. A well-equipped Resource Center in a separate room supplements the laboratory experience.

School: Nashua Vocational Center
Program: Electronics
Instructor: Robert Reynolds

Student skill development is accomplished through a series of instructor-developed, self-instructional written modules. A series of core skill modules leads students to specialized modules in Computers, Communications or Electro-Mechanical Devices. The modules are designed to provide for a self-paced, continuous-progress learning process.

School: Plymouth Vocational Center
Program: Power Mechanics
Instructor: Tim Peters

A series of auto-tutorial, commercially purchased instructional modules are used as the basis for instruction. The machines and the software are used in a laboratory environment, providing students with visual and auditory instruction for the hands-on occupational skills development required.

School: Dover Vocational Center
Program: Food Service
Instructor: Douglas Coons

A well-defined task analysis related to the occupational cluster is reflected in a series of individualized learning packages (ILP's). Each package provides directions to produce a finished product. An evaluation scheme, designed to involve students in determining quality standards, is also part of the program.

School: Somersworth Vocational Center
Program: Community Based Multi-Occupational
Director: Susan Klaiber

The community business and industrial employers serve as instructors to interested students. Students obtain skills in the actual occupational environment. Skills are determined by a detailed task analysis for the occupation. Student progress is continuously monitored by school personnel.

School: New Hampshire Vocational-Technical College - Manchester
Program: Industrial Welding
Instructor: Mel Ciulla

Welding laboratory skill development is designed to be self-paced, continuous progress. Instructional sheets containing welding skill processes are used by students. Competency checklists are used by the instructor to record student progress. Recordkeeping is maintained primarily by students. Students have access to the lab on an open basis.

ADMINISTRATORS AND CONSULTANTS
STATE DEPARTMENT OF EDUCATION
VOCATIONAL-TECHNICAL DIVISION
105 LOUDON ROAD
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JUNE, 1978

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Mr. Robert Holt	Trades and Industry Consultant	271-3587
Ms. Josephine Hayslip	Vocational Guidance Consultant	271-2664
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Dr. Nishma Duffy	Equal Access Consultant	271-2197
Mr. Donald Peterson	Business and Office Education Consultant	271-2725
Mr. Thomas Besaw	Distributive/Cooperative Education Consultant	271-2479
Ms. Judith Fillion	Health Occupations Consultant	271-2662
Ms. Sharon Glasscock	Consumer Education and Homemaking Consultant	271-2160
To be announced	Industrial Arts Consultant	271-3586

OBJECTIVES

A behavioral or performance objective is a statement communicating an instructor's intentions by denoting behavior which a student must demonstrate when he or she has successfully completed a learning experience. The statement should have sufficient detail so that others will interpret the statement the same way the author interprets it.

The chief purposes for stating an objective are:

1. to communicate the author's intentions in clear terms; and
2. to allow the total curriculum to be critically examined.

Two popular methods of writing the behavioral or performance objective are the Magerian Method and the ABCD Method. The Magerian Method (named for its creator, Robert F. Mager) comprises three components:

1. Performance - what the student will be able to do.
2. Conditions - what is given or not given to the student in the course of performing the task.
3. Criterion - the quality or quantity measure of performance.

EXAMPLE: AUTO MECHANICS - UNIT ON EXHAUST SYSTEM

Magerian Method

Performance - Inspect, list parts needed, order and install any new parts.

Conditions - Given an automobile with a defective muffler system, and instruction.

Criterion - 100% no leaks, according to manufacturer's specifications.

In the ABCD Method, there are four components:

1. Audience - usually the student
2. Behavior - what the student will be able to do
3. Conditions - what is given or not given to the student in the course of performing the task
4. Degree - the quality or quantity measure of performance

EXAMPLE: AUTO MECHANICS - UNIT ON EXHAUST SYSTEM

ABCD Method

Audience - Each student.

Behavior - Will inspect, list parts needed, order and install any new parts.

Conditions - Given an automobile with a defective muffler system, and instruction.

Degree - 100% no leaks, according to manufacturer's specifications.

As can be seen by the examples above, either method will provide a statement that is precise and measurable. You must be careful not to use words that have meanings that can be misunderstood. Words or phrases such as the following should be avoided:

understand
appreciate
internalize
to know
to grasp the significance of
to believe

There are others, so exercise some care in choosing your words. Ask yourself if the word will be clear to the student without interpretation. If

it isn't, look for a better word or phrase to describe precisely what is to be accomplished. The following is a list of action verbs having very precise meanings related to specific kinds of learning. Use this list as you create your own objectives.

Specific Responding

(producing a single, isolated response)

- to associate
- to grasp (with hand)
- to identify
- to label
- to locate
- to move
- to pick up
- to press
- to push
- to repeat
- to respond
- to say
- to signal
- to tighten
- to turn
- to give a word for
- to hold
- to indicate
- to lift
- to loosen
- to name
- to place
- to pull
- to recognize
- to reply
- to rotate
- to set
- to slide
- to touch
- to twist

Motor Chaining

(producing a sequence of motions)

- to activate
- to align
- to copy
- to (dis)connect
- to duplicate
- to load
- to measure
- to operate
- to replace
- to trace
- to turn off
- to adjust
- to close
- to (dis)assemble
- to draw
- to insert
- to manipulate
- to open
- to remove
- to stencil
- to tune
- to turn on

Verbal Chaining

(producing a sequence of words)

- to cite
- to enumerate
- to list
- to recite
- to reiterate
- to reproduce
- to transcribe
- to copy
- to letter
- to quote
- to record
- to repeat
- to (re)state
- to type

Discriminating

(identifying two or more stimuli)

- to choose
- to contrast
- to decide
- to differentiate
- to distinguish
- to judge
- to mate
- to pick
- to select
- to compare
- to couple
- to detect
- to discern
- to isolate
- to match
- to pair
- to recognize

Classifying

(using concepts)

- to allocate
- to assign
- to categorize
- to classify
- to divide
- to grade
- to index
- to itemize
- to rank
- to reject
- to sort
- to survey
- to arrange
- to catalogue
- to characterize
- to collect
- to file
- to group
- to inventory
- to order
- to rate
- to screen
- to specify
- to tabulate

Rule-Using

(using principles)

- to anticipate
- to calculate
- to calibrate
- to check
- to compile
- to compute
- to conclude
- to construct
- to convert
- to coordinate
- to correct
- to deduce
- to define
- to demonstrate
- to design
- to determine
- to diagram
- to equate
- to estimate
- to evaluate
- to examine
- to expect
- to explain
- to extrapolate
- to figure
- to foresee
- to generalize
- to illustrate
- to infer
- to interpolate
- to interpret
- to monitor
- to organize
- to plan
- to predict
- to prescribe
- to program
- to project
- to schedule
- to solve
- to translate
- to verify

Problem-Solving

(combining two or more principles)

- to accommodate
- to adapt
- to adjust to
- to analyze
- to compose
- to contrive
- to correlate
- to create
- to develop
- to devise
- to diagnose
- to discover
- to find a way
- to invent
- to realize
- to reason
- to resolve
- to study
- to synthesize
- to think through
- to trouble shoot

Now let's construct an objective using the Magerian Method. First, identify the performance by name; you can specify the kind of behavior that will be accepted as evidence that the learner has achieved the objective. What is the learner doing when demonstrating that the objective has been achieved?

Example: Write a summary
Measure the bolt size

Second, try to define the desired behavior by describing the important conditions (givens, restrictions or both) under which the learner will demonstrate competence. What will the learner be provided or denied?

Example: Without the aid of references
With a micrometer

Third, specify the criterion of acceptable performance by describing how well the learner must perform to be considered acceptable. This may be achieved by:

Time limits
Minimum number of acceptable correct responses

Example: Within a period of 30 minutes
With 100% accuracy

Completed examples:

Write a summary, without the aid of references, within a period of 30 minutes.

Measure the bolt size, with a micrometer, with 100% accuracy.

Using the information presented here, practice writing your own instructional objectives.

OBJECTIVES AND DOMAINS

When the objective requires students to use intellectual or mental abilities, we call this a cognitive objective. When the objective requires the student to demonstrate physical behavior or manual dexterity, we call this a psychomotor objective. When the objective requires the student to express attitudes, feelings, interests or values, we call this an affective objective.

In each area - cognitive, psychomotor and affective, there are different levels of response that may be required of the learner. On the charts that follow, the possible response levels are defined for each domain and a list of sample performances is provided.

The levels of response in the charts reflect simple-to-complex learning requirements. It is not always possible for instructors to write an objective and then identify the type and level precisely.

The important issue is for the instructor to be aware of the types and levels discussed; and with this in mind, write objectives that will reflect the students' learning capabilities and the demands of the job skill.

KNOWING = CONCEPT = COGNITIVE

Level	Definition	Performance
1. Knowledge	Recall facts	Can repeat Ohm's Law, Kirshoff's Law
2. Comprehension	Interprets or translates facts	When given E + I, can solve for R (Ohm's Law).
3. Application	Applies principles to single facts	Can build an electrical circuit
4. Analysis	Applies principles to complex facts	Can build a multi-circuit system
5. Synthesis	Applies principles to complex facts to formulate a new solution	Can troubleshoot a complex circuit
6. Evaluation	Applies principles to complex facts to formulate a new solution and compares this to other known solutions	Can re-design the circuits more efficiently

DOING = MANIPULATIVE SKILL = PSYCHOMOTOR

Level	Definition	Performance
1. Imitation	Observe and copy crudely	Can watch someone ride a bicycle
2. Manipulation	Observe and perform as instructed	Can ride a bicycle (shaky)
3. Precision	Observe and perform precisely as instructed	Can ride a bicycle without shaking
4. Articulation	Observe and perform a series of skills with speed and precision	Can get on bicycle, can ride with ease, can get off bicycle
5. Naturalization	High level of speed and precision becomes habitual	Can get on bicycle, can ride and get off bicycle without having to think about it

FEELING = VALUE = AFFECTIVE

Level	Definition	Performance
1. Receive	Can listen effectively	Student listens to safety lecture
2. Respond	Can listen and react effectively	Student recalls safety facts when needed
3. Value	Can listen and react with a formulated opinion of his/her own	Student recognizes reasons for using safety
4. Organize	Can formulate a set of opinions on his/her own	Student is committed to the use of safety practices
5. Characterize	Can exhibit signs of practice in his/her opinions	Student always uses the correct safety practices

CHARACTERISTICS OF MEDIA

1. Programmed Instruction

   a. one-to-one instructor-student relationship
   b. sequential order - step-by-step progression
   c. immediate reinforcement
   d. progress at individual's rate of learning
   e. immediate response

2. Motion Picture: 8mm and 16mm films

   a. provides visual concepts that cannot ordinarily be attained in a classroom situation
   b. provides slow motion, stop action, speeded up motion, animation

3. Television

   a. provides a high level of teaching and learning experience in areas where such teaching is not provided by the local school district
   b. education can occur for a large number, even though instructors of good quality are limited
   c. may draw upon audio-visual materials which are not available to regular classroom instructors - television can employ any other type of audio-visual media
   d. provides the advantage of immediacy
   e. videotape can be reshown or projected - in this way the same material can be presented many times through the day

4. Filmstrips and Slides

   a. easily made
   b. requires only a moderately darkened room
   c. are inexpensive
   d. provides color inexpensively
   e. may be used with verbal cues
   f. available in great variety
   g. aids in attention focusing

5. Transparencies and Overhead Projection

   a. can be operated from front of room so that instructor-student eye contact can be maintained
   b. can project one step at a time and end up with complete projection overlays
   c. cellophane roll is often built in so that writing may be done and then removed immediately
   d. transparency itself can be written on without damage
   e. material easily traced in making transparencies

6. Opaque Projection

a. permits non-transparent materials to be projected on screen for group use and instruction (books, flat pictures, objects, specimen)
b. readily available and cost-free materials
c. material can be transferred to the chalkboard for tracing
d. aids in attention focusing

7. Tape Recorder

a. audio aid
b. presents semi-permanent sound recordings
c. can be erased and re-used many times

8. Phonograph

a. has most of characteristics of tape recorder
b. relatively inexpensive
c. instructor has complete control in using educational recordings

9. Chalkboard

a. makes it possible to quickly change and rearrange - both valuable in developmental thinking
b. may be used in combination with projected media
c. students are overtly involved and it involves their interests
d. easily obtained and readily available
e. focuses attention and makes things interesting
f. moves at the rate of the learner and the instructor
g. a medium through which group projects can be done

10. Drawing

a. readily available at little cost
b. well-suited to individual and small group study
c. well-suited to group studies in combination with overhead projector
d. ideally suited to study displays
e. easily stored
f. may be used over and over if mounted and cared for

11. Graphs

a. may present a visual representation of numerical value
b. compare qualitative information simply and quickly
c. reveal the most important relationship(s) in data

12. Diagrams

a. most condensed of all drawings
b. show interrelationships, general outlines or key features of a process, object or area

13. Chart

a. combines graphics and pictorial media
b. aids in visualizing relationship between key facts and ideas in an orderly and logical way
c. shows relationship as a sequence of events

14. Poster

a. communicates a single idea
b. tells an obvious story quickly
c. catches the eye

15. Cartoon

a. communicates a single idea
b. employs humor, characature, satire, exaggeration, symbolism
c. simplifies issues
d. catches the eye

16. Comic Strips

a. have colorful illustrations, rapidly moving story and often use realistic people as characters
b. tell a story
c. capture the attention

17. Model

a. reduced imitations of large objects or enlarged imitations of small objects
b. provides interior views of objects normally covered and otherwise invisible
c. employs color and texture to accent important features
d. can be touched by the student

18. Object and Specimen

a. provides the real object, if not too complex for easy observation
b. allows student firsthand experience

19. Computer-assisted Instruction

a. the control of the learning process is always vested in learning sequences created by instructional personnel; CAI permits the teaching staff to take on the coordinator's role in the teaching-learning process; the instructor can use time more productively (individual counseling and guiding students requiring additional attention).
b. can use the storage facilities of the computer to assess individual progress, initiate and monitor remedial work if and as needed
c. through time-sharing, can accommodate many students, each of whom appears to have exclusive use of the computer
d. can perform its functions with less error and more speed than a human instructor

USE OF REFERENCES

Dictionary of Occupational Titles

Vocational Education and Occupations

Use of the Dictionary of Occupational Titles

The Dictionary of Occupational Titles is published by the United States Department of Labor. The book can be very valuable to anyone attempting to analyze an occupation or select occupations for an instructional program. Copies can be found in most public libraries and in each vocational center in the State. The third edition, comprising two volumes, was printed in 1969. The fourth edition has just been released. Your school or library may or may not have the new edition, which has been printed in one volume. To be safe, the explanation provided here is based on the two-volume third edition. If you have the new edition available, an explanation of changes is written on pages xxiii - xxv in the front of the publication.

Using Volume I of the D.O.T.

Volume I contains an alphabetized list of almost 22,000 jobs and 36,000 job titles with D.O.T. code numbers and definitions. Within the description of the occupation, the following information is included: what work is done, how it is done and why it is done.

Using Volume II of the D.O.T.

Volume II is designed to complement Volume I. It contains information relevant to grouping jobs having the same occupational characteristics. This is important so as to discern relationships among occupations, and

as a simple approach to classifying the abilities, vocational experiences and potentials of workers.

Particular emphasis is placed on the work performed, worker requirements, training, methods of entry and worker qualification profiles.

D.O.T. Code Numbers

Each occupation in the D.O.T. is assigned a six-digit code number. There are three digits to the right of a decimal point and three digits to the left (XXX.XXX). Each of the digits has a special meaning.

The first three digits indicate the occupation group arrangement. Jobs are grouped according to some combination of work field, purpose, material, product, service, subject matter, generic term or industry. There are nine categories for the first digit, 84 possible combinations for the first two digits and 603 possible combinations for all three digits. As an example, let's use the number for a secretary - "201."

First digit position:	Category 2	(Clerical and Sales Occupations)
Second digit position:	Division 20	(Stenography, Typing, Filing and related occupations)
Third digit position:	Group 201	(Secretaries)

Definitions of each of the categories, divisions and groups appear in Volume II of the D.O.T. in the section entitled "Occupational Group Arrangement of Titles and Codes" beginning on page 33.

The three digits to the right of the decimal point reflect the degree of the occupation's involvement with data, people or things, how simple or complex the involvement is and the highest function the worker will have to

assume in dealing with all three.

For example, using the previous occupation (secretary), the three digits to the right of the decimal point are ".368." The digits represent the following:

Fourth digit position:	3	The worker function in the Data category is "Compiling"
Fifth digit position:	6	The worker function in the People category is "Speaking"
Sixth digit position:	8	The worker function for this particular number (8) indicates that there is no significant relationship to the Things category

In review then, the D.O.T. code number for a secretary is 201.368.

The relationships of worker functions within the data, people and things categories are explained and defined more fully on pages 649-650 in Appendix A in Volume II of the D.O.T.

Worker Traits Arrangement

Information concerning personal traits and characteristics is provided for each occupation. Information such as general educational development, specific vocational preparation, aptitudes, interests, temperaments and physical demands is contained in the Worker Traits Arrangement. These groups are presented in Volume II of the D.O.T. in the section entitled "Worker Traits Arrangement of Titles and Codes," beginning on page 225.

This information may also be helpful as you develop your occupational cluster. Further detailed information on the use of the D.O.T. can be found in the initial pages of each volume.

Use of Vocational Education and Occupations

Vocational Education and Occupations is published by the United States Office of Education. It is designed to relate occupational titles appearing in the D.O.T. to vocational education instructional program titles used in educational institutions. To obtain a copy of this document, see your vocational director.

The relationship between occupational titles and instructional programs is described through the use of an eight-digit, numerically coded classification system.

It is important to use this classification system in addition to the system described in the D.O.T. As funding for vocational programs is partially accomplished through the U.S. Office of Education funds, vocational directors and state program consultants must report data by the U.S.O.E. Instructional Program Classification System. By understanding and using the system, you are, therefore, easing the reporting problems of those persons who are responsible for some of your program funds.

The system may appear complicated; however, it is suggested that you:

1. read the explanation of the example below;
2. read the explanation of the classification system appearing on page x of the document;
3. consult your vocational director or state consultant if you are still having problems.

Example: If you wanted to use the U.S.O.E. classification for the D.O.T. number 213.582 (Keypunch Operator), the occupation would be coded as shown on the following page.

U.S.O.E. Code 14.020201

Explanation:

(14.) is the major vocational area code number for the subject matter area of Office Occupations.

14.(02) is the principal segment of the subject matter: Business Data Processing Systems Occupations.

14.02(02) is the division of the principal segment: Peripheral Equipment Operators.

14.0202(01) is the first-level detail of the division of the principal segment: Keypunch and Coding Equipment Operators.

The above sample is taken from page x of the U.S.O.E. publication. Please refer to that page for a more in-depth explanation of the classification system.